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BOWEN'S DISEASE OF THE CONJUNCTIVA*

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Bowen[1] in 1912 described a chronic condition of the skin which he had observed in two patients and which was characterized by certain clinical and histologic features. The lesions appear as single or multiple papulo-squamous nodules in the skin that are sharply circumscribed from the surrounding area. They may be pale or dark red in color. The nodules are firm, slightly raised above the skin, and smooth or papillomatous on the surface. Two years later Darier[2] reported four further cases, in which he confirmed the findings of Bowen, and minutely described the microscopic structure of the cells that showed the abnormal features. Since then, many cases have been reported from observers in different parts of Europe and America which have essentially supported the earlier observations and have substantiated the opinion of Bowen that the initial lesion, if not completely eradicated exhibits a decided tendency to an eventually malignant transformation. The clinical form of the disease of the skin is extremely variable and may appear as simple erythematous spots (initial stage of Darier), as papules, or as crusty, hyperkeratotic, vegetating plaques. The microscopic characters, however, are remarkably constant. It has therefore been suggested—I believe wrongly—that the disease entity, if it exists at all, is more in the nature of a histologic pattern than a definite clinical condition. Similar histologic changes have been described in localized patches on the mucous membranes, particularly the vulva (Richon[3]), glans penis (Jessner[4]), and the tongue. Recent reviews by Stout[5] and by Cipollaro and Foster[6] have fully described the known facts regarding the location and malignant manifestations of the disease.

The following case is described because the original lesion and the repeated recurrences presented all the histologic characters of Bowen's disease in the epithelium covering the sclerotic of the eyes. It was probably the first case of the disease reported[7] in that location, and it had been observed for more than eight years until the death of the patient from some other cause. Recently McGavic[8] has reported five specimens from the Eye Institute, New York, which he believed showed the histopathologic changes of Bowen's disease occurring in the cornea and conjunctiva. McGavic has stated that "the clinical course of the lesions is so unusual, the microscopic picture so characteristic, and the problem of therapy so challenging that a discussion of the subject is in order." I had hesitated to report the case fully as my opinion regarding the nature of the lesion was at variance with that of an eminent English ophthalmologist, and the patient was under observation until recently.

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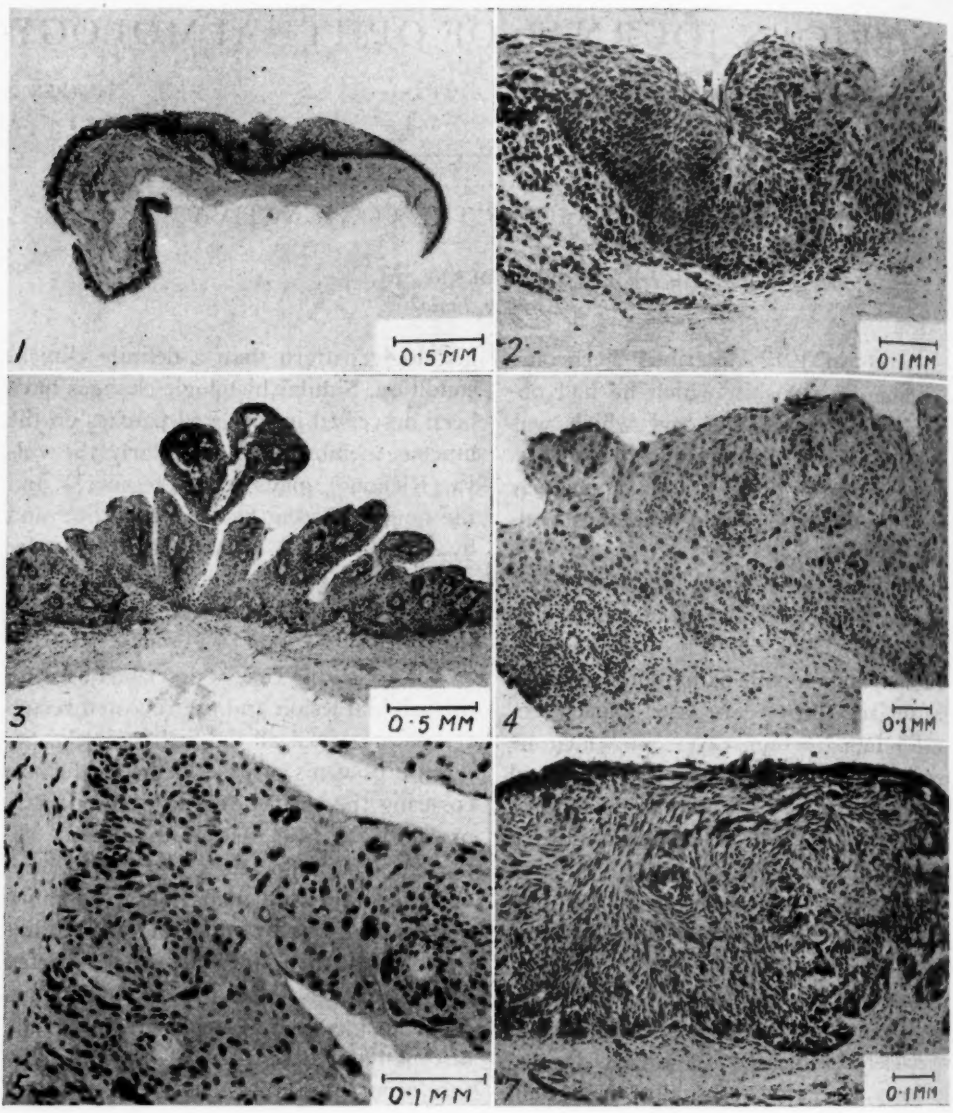

Fig. 1 (Khanolkar). Photomacrograph of a section of the entire tissue removed on January 11, 1938, showing a sharp transition from the normal epithelium at the periphery to the thickened altered conjunctival epithelium in the neoplastic zone. The epithelial cells are disposed in a disorderly manner, and there is a tendency to folding of the thickened epithlium. The epithelial cells are clearly demarcated from the subepithelial tissue, which shows increased vascularity and a mild inflammatory reaction.

Fig. 2 (Khanolkar). A photomicrograph of the tumor area in figure 1, showing a proliferation of the epithelial cells, a loss of the neat palisade arrangement of cells in the basal layer, and a marked variation in the size and shape of squamous cells (poikilokarynosis). A few giant cells and cells with multiple clumped nuclei are also seen. Two very large cells with a bizarre arrangement of chromatin are present.

Fig. 3 (Khanolkar). Photomacrograph of the central portion of the tissue excised on May 11, 1938. The epithelium is thrown into well-marked folds and papillary processes. The histologic characteristics of the tumor cells remains similar to those in the original lesion.

Fig. 4 (Khanolkar). Photomicrograph of a small area from one of the papillae in figure 3.

Case report

A physician, aged 70 years, noticed an acute inflammation of the conjunctiva of his right eye for the first time in January, 1936. He had lost his left eye as a small boy following an injury on the cricket field, and he attributed the conjunctivitis to an undue strain on the eye during the course of his work. The inflammation subsided after a couple of days of treatment with drops of 10-percent argyrol solution. The conjunctivitis began to recur every three to four months, but cleared up every time after a short course of argyrol instillations. In July, 1937, a fresh attack of conjunctivitis did not clear up completely with the usual treatment, but left an injected patch half way between the limbus and the outer angle of the eye, with two or three dilated blood vessels coursing across it. The presence of the patch was attended by no pain, although it led to a feeling of discomfort, yielding a sensation of a foreign body on the eyeball. Treatment with the usual medicaments led to no improvement of the condition. Three months later (October, 1937) the patch appeared to be slightly raised above the surface, reddish in color, and irregular in outline. A few weeks later the affected area began to spread rapidly and encroach on the limbus. The case was diagnosed as a papilloma of the conjunctiva by Dr. B. P. Banaji and he decided to excise the involved portion of the conjunctiva. At the operation (January, 1938) the conjunctiva of the affected area was removed by a superficial incision, and the underlying sclera was scraped. The nodule was not adherent to the deeper structures (figs. 1, 2). The area that had been operated on healed completely without leaving any noticeable scar. The excised tissue was examined histologically and was reported upon by me as follows: "The conjunctival epithelium in the healthy portion, which is slightly thinned out, passes abruptly into

Fig. 6 (Khanolkar). Clinical appearance of the lesion as seen on the occasion of the third recurrence in April, 1939. The vascularity of the lesion is noticeable.

an epithelial lining several layers thick. In this affected area the epithelium is slightly folded with a small amount of keratinization in the most superficial layers. The normal arrangement of cells appears to be disturbed in the altered epithelium, and certain large cells are seen sprinkled or grouped between normal cells without any definite arrangement. These cells were about 8 to 10 times the size of normal polyhedral cells. Some of them showed the chromatin arranged in atypical mitotic figures lying in the middle of finely granular cytoplasm, whereas others were found

Fig. 5 (Khanolkar). A higher-power photomicrograph to show the microscopic features of the tumor cells. The "clumping cells" of Bowen and the "corps ronds" of Darier are easily recognizable.

Fig. 7 (Khanolkar). Photomicrograph of the nodule excised in April, 1939, showing a whorled arrangement of elongated spindle-shaped epithelial cells and their anaplastic character.

with several large nuclei clumped together in the center of monstrous cells. Some of the remaining cells, which were about normal in size, showed hyperchromatic dense nuclei surrounded by clear spaces (intracellular edema). Many darkly staining round clumps of chromatin are seen surrounded by clear zones ('corps ronds' of Darier). None of these cells is seen to be lying disassociated from its neighbors in clear spaces of intracellular edema. The fine clear lines separating the epithelial cells are clearly seen in most areas. A rapidly proliferative activity in the cells is evidenced by a large number of mitoses in the thickened epithelium. The subepithelial tissue consists of a richly vascular connective tissue with a mild inflammatory exudate mainly consisting of lymphocytes and histiocytes. *Diagnosis:* There is evidence of an atypical change in the cells of the squamous epithelium suggestive of a precancerous condition (Bowen's disease.)"

Three months later a small opaque nodule appeared near the site of the original lesion and was removed on May 11, 1938. A histologic examination of the excised piece showed that the affected epithelium was thrown into folds or papillary processes, but there was no evidence of infiltration of epithelial cells into subjacent connective tissue. The tumor cells presented a more advanced atypical change than those in the first piece, with evidences of a more noticeable variation in the size and shape of cells (figs. 3, 4, 5). The patient was naturally worried about the condition of his only existing eye and went to England for consultation and advice. He was seen by one of the leading ophthalmologists in that country in June, 1938, and the following opinion was given: "I have examined the slides which Dr. —— has shown me and I am satisfied that the original growth, which was removed in January, is a simple papilloma without any trace of malignancy. The recurrence which was excised in May is again a simple papilloma, but the slightly different character of some of the cells would lead me to suggest that if it recurs, which it probably will, it should again be excised widely and radium applied for some days after" (June 23, 1938).

There was another recurrence soon after the patient's return to India, in August, 1938, on the conjunctiva near the area which had been removed in October, 1938. The histologic characters of the excised nodules were again reported as being similar in structure to the original piece examined in January.

The patient remained well for the next five months (until March, 1939), when it was noticed that a small white nodule had appeared on the conjunctiva near the limbus. It did not appear to grow much during the first fortnight but took on an accelerated growth thereafter. It was noticed that the nodule had reached a diamter of 3 mm. in the next fortnight. It was raised above the surface, grayish white in appearance, and showed a fine network of dilated blood capillaries at its periphery. In its medial spread it had passed the limbus and was extending on to the cornea (fig. 6). The nodule was removed in April, 1939 (fig. 7), with a wide margin of conjunctiva beyond its outer limits.

The histologic features of the last piece deserve a detailed description. "A small nodule of thickened conjunctival epithelium is seen continuous with the adjacent epithelial lining. The tumor tissue is sharply demarcated from the underlying vascular connective tissue. The nodule is almost entirely composed of bundles or whorls of elongated spindle-shaped cells with few multinucleated cells scattered in the tissue. The spindle cells show all stages of transition from the polygonal

squamous epithelial cells. The chromatin in the nuclei of the tumor cells is dense and compact. The chromatin network and nucleoli are not clearly seen. There appears to be a marked variation in the size and shape of cells. *Diagnosis:* Spindle-cell carcinoma of the conjunctiva."

The patient went for further treatment to England in May, 1939, and was treated with two applications of radium. He could not receive the third application owing to the outbreak of hostilities in Europe and his desire to return to India immediately. Details of dosage and method of radium therapy employed in the case are not available. There was no recurrence of the eye lesion up to the time of the patient's death, 4½ years later.

Discussion

The case presents many interesting features in as much as it was possible to observe the initial lesion and the three subsequent recurrences over a period of three years and to follow the course of the disease from the earliest subjective disturbances till the death of the patient 8½ years later. It was possible to study the histology of the tissue removed on four different occasions, when it was observed that the structure manifested a progressive alteration from a relatively benign lesion to a definitely malignant tumor. The question of treatment in these cases has given rise to conflicting opinions. It may be suggested that an alert ophthalmologist should, in a suspected case, remove the whole superficially situated nodule by surgical excision and send the tissue for a careful histologic investigation. Treatment by irradiation may be immediately instituted if the lesion is reported to be Bowen's disease of the conjunctiva. The treatment of choice would be utilization of the unfiltered radiation from a bare radium bulb. The total dose would comprise about 500 millicurie-minutes, distributed over two to three applications at intervals of a fortnight.

Summary

One more case of Bowen's disease of the eyeball has been described, which had been under observation for a period of 8½ years. The clinical and histologic findings have been described and the treatment of the disease has been discussed.

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PREGLAUCOMA*

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Ever since I first proposed the term "preglaucoma," in 1924, to designate the condition in which an ocular hypertension may be expected to develop in the course of time (one year previously Koeppe had used the term "preglaucomatous stage" in referring to the pigment disturbance he described), much work has been done and much has been written about tests to confirm such diagnosis. But nothing has been said about the type of hypertension that can be anticipated from the character of the preglaucomatous eye, and it seems to me of importance that such definite differentiation be established. Not only will the type of preventive treatment vary but the visual prognosis for the patient also varies greatly.

Two forms of ocular hypertension can be foretold from the preglaucomatous condition: first, the acute, shallow-angle type with the manifestations of acute decompensation; and second, the chronic, deep-angle form, with its insidious onset. The conditions of the eye before the onset of either form are entirely different, and in many cases can be recognized easily without recourse to provocative tests. It is of the utmost importance that such differentiation be made as complete as possible; for in one case provocative tests could lead to irreparable disaster, whereas in the chronic form such tests may be made with impunity. In consequence, a careful clinical study is indicated as the first measure.

As the knowledge concerning ocular hypertension has progressed in the past 25 years, it has become recognized that an impending disturbance of ocular-pressure balance causes certain signs and symptoms that can be detected upon careful search. In as much as nearly 20 percent of all blindness is due to glaucoma, it behooves the ophthalmologist to suspect the possibilities of that condition in every patient past the age of 30 years, and his examination of all such patients should include those aspects which, if suspicious, would warrant further investigation with a view to determining whether preglaucoma exists. But such precautions can be carried to excess, and to perform elaborate provocative tests upon all patients is just as senseless as to neglect them in suspicious cases. What, then, are the appearances that should indicate further investigation as to the existence of a preglaucomatous state?

First to be considered are the eyes that may develop acute hypertension. The history that can be obtained from the patient is of great significance, greater than in the chronic type. The description of prodromal attacks of acute hypertension, lasting from one-half to three or four hours, is, as a rule, so characteristic that the diagnosis is obvious. Furthermore, the history of pain developing after an emotional or physical disturbance or after a stay of upward of 15 minutes in the dark, occasional halo vision, decreased visual acuity, moderate injection of the eyeball, gastric disturbances, or partial shock with spontaneous recovery, is of utmost significance. Only a limited number of preglaucomatous patients have had prodromal attacks, but other significant features can be elicited. Headaches that appear with fairly constant regularity after 10 to 15 minutes in a dark room,

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such as at a cinema, are of importance. A slight decrease in dark adaptation, as noted by an intelligent patient, may be of diagnostic significance but is not common.

Such patients are seldom under 45 years of age or more than 70. Refraction plays a far greater role in eyes likely to develop acute than it does in those that will develop a chronic glaucoma, as myopia, even of a moderate degree, is seldom present. A moment's reflection will recall the fact that the myopic eye is larger than the average normal in antero-posterior measurements, and in consequence the anterior chamber is deeper and the angle of the chamber is less acute. Goniometric measurements by Sugar and myself have shown the mathematical value of the angle in myopia to be greater than that in hyperopia, usually. In consequence, there is less possibility of blockage of the trabeculum by the root of the iris; in fact, the danger of chamber-angle occlusion is negligible in the wider-angled chambers. Following the same line of reasoning, it can be understood that there are certain types of irides that can easily block the chamber angle; namely, those in which the antero-posterior thickness is somewhat greater than the average and in which pupillary dilatation can cause an undue increase in antero-posterior thickness of the iris root. In every eye in which there is the anatomic predisposition to acute glaucoma, there exists a definite threshold of pupillary dilatation. By that is meant that when the pupil dilates beyond the given threshold of that eye, it is accomplished by such an increase in the antero-posterior thickness of the root of the iris that there is formed a blockage of the chamber angle and of the trabeculum, with the consequent acute rise in intraocular pressure. As yet there is no means of determining what that threshold is in the individual eyes. For that reason, certain provocative tests are definitely contraindicated in the preglaucomatous stage of the acute-glaucoma type.

In patients who have had definite prodromal attacks, remains of such attacks may be seen in one or both of two forms. The first is a slight irregular dilatation of the pupil, usually upward, and involving about one quarter of the periphery, as though there had been a partial paralysis of the sphincter pupillae, which probably had occurred. The second is a partial sector-shaped disappearance of the iris stromal chromatophores, resulting in a limited area of light decoloration. This has been seen in blue irides, but is more common in the darker brown ones. Never is there the complete washed-out appearance that so frequently persists after an actual, acute attack. This pigment disturbance must not be confused with the Koeppe pigment-granule appearance that is found so frequently in compensated glaucoma.

To recapitulate briefly, when a patient in the fourth, fifth, or sixth decade of life presents a history suggestive of real, prodromal attacks or a history of headaches developing after a short period of absence of light, or after emotional excitement, the eyes should be examined most carefully from a standpoint of preglaucoma of the acute type. The depth of the anterior chamber, the estimation of the mathematical value of the angle of the chamber, the size, shape, and reaction of the pupil, and the appearance of anomalies of pigmentation of the iris must all be taken into account. Abnormalities of the visual fields, either central or peripheral, need not be looked for, for field changes do not occur. Neither will there be variations in tension from what may be the normal for that eye. Visual acuity will not be disturbed except by any refractive error that may be present.

If the suspicions of the ophthalmologist are sufficiently aroused, certain provocative tests may be undertaken; but they are less apt to yield positive information than similar tests in preglaucoma of the chronic type. Under no circumstances should provocative dilatation of the pupil be performed except in a patient with a highly suspicious eye who lives so far away from ophthalmologic care that an acute attack would spell certain blindness before relief from the hypertension could be obtained. But taken by and large, the diagnosis of preglaucoma of the acute type is dependent rather upon the experience of the ophthalmologist than upon positive information given by provocative tests.

When the ophthalmologist has decided in his own mind that he has to deal with a preglaucomatous condition of the acute type, it becomes his function to institute measures aimed at preventing an acute attack. If the chamber angle is very acute and if there have been prodromal attacks, the use of miotics alone as a preventive measure probably will not suffice, and the patient will have to be persuaded that his visual future depends upon preventive surgery. Peripheral iridectomy, freeing at least 25 degrees of the entire chamber angle, will prevent further hypertension. The iridectomy should be bilateral. But if there have been no prodromal attacks and if the chamber angle is not too acute, miotics will, as a rule, be adequate to prevent acute hypertension. However, it is just as great a mistake to use miotics of too great concentration and at too frequent intervals as it is to use no miotic at all. A solution of 1-percent pilocarpine should be instilled in both eyes at bedtime, as well as before any period of use of the eyes in the dark, such as at the cinema. The patient must be told of the dangers of pupillary dilatation and how this can be avoided by the use of the miotic, in order that there may be intelligent coöperation on his part.

Considerably more clinical acumen is required to detect preglaucoma of the chronic type. Primarily, the history affords but few clues, for there have been no acute attacks nor headaches nor disturbed visual acuity. In some intelligent patients a definite story of decreased dark adaptation can be elicited, but that is not constant. In a large percentage of cases, heredity plays a definite role, and frequently the patient knows of definite glaucoma in a parent or a sibling. Consequently, with the lack of a definite anamnestic aid, the suspicion of preglaucoma must come objectively. The range of age is much greater, for chronic glaucoma of the compensated type is not uncommon in the third decade of life (or even earlier—I recall one case in a myopic girl of 13 years) and may appear at any time as long as the person lives. Refraction does not seem to play any role of importance, as hyperopia is present in 65 percent of the cases and myopia in 35 percent. That is approximately the comparative percentage of refractive errors in normal individuals of the same age group in this country. The depth of the anterior chamber is usually that which may be considered normal for the patient's age, with the single exception that under mydriasis the chamber has a tendency to become slightly shallower. When examined gonioscopically, the angle of the anterior chamber is always open and usually has a mathematical value typical of wide-open angles. In other words, there is no indication of possible blockage of the angle by the iris root. In some cases there may be a slight increase in the pigment granules or dust, seen so frequently on the surface of the trabeculum. Likewise, there may be the Koeppe pigment dotting of the surface or anterior

stroma of the iris, a finding that is suspicious but not diagnostic.

The pupil tends readily to dilate somewhat unduly, but the reactions are normal, even to the hippus-like reaction that occurs when the narrow beam of the slitlamp falls upon the pupillary border. In some cases (the percentage is not yet known) exfoliations of the anterior capsule of the lens are present, and while these are not to be taken lightly, still the presence of that condition is not absolutely diagnostic of either glaucoma or preglaucoma. In true preglaucoma of the chronic type, there are no abnormalities in the fundus nor in the optic nerve attributable to that condition.

When the ophthalmologist's suspicions have been aroused to the extent of making a complete perimetric examination, defects of the peripheral fields of a hypertensive character cannot, as a rule, be elicited. In a few cases, slight notching of the inferior nasal field can be demonstrated by the use of a marked reduction in intensity of illumination; however, this finding is not sufficiently constant to justify a routine examination of that type. But in the central fields there is not infrequently a rather significant enlargement of the blind spot of from 1 to 5 degrees. The cause of such enlargement is unknown. It is definitely not due to hypertension, as is frequently the cause in cases of established chronic compensated glaucoma. The other central-field defects that are usually found in chronic glaucoma have not yet made their appearance.

Consequently, when the suspicions of the ophthalmologist have been aroused, the diagnosis of preglaucoma of the chronic type must be established or refuted by provocative tests. Many have been described and practically all are based upon varying amounts of increase in intraocular pressure produced by various procedures. Probably the most reliable of all is an increase in pressure of more than 8 mm. Hg, measured tonometrically, as the result of the drinking test or after instillation of a mydriatic; but even this is not characteristic. Positive responses to the various provocative tests are significant, although not absolute, whereas negative responses mean very little if anything at all. So the diagnosis of preglaucoma of the chronic type becomes a function of the clinical acumen and experience of the ophthalmologist, plus some aid from provocative tests.

After such diagnosis has been established, it becomes the function of the ophthalmologist to utilize that knowledge for the benefit of the patient to prevent, in so far as possible, the gradual development of a chronic compensated glaucoma. While this is not always possible, the process may at least be retarded. A weak miotic, usually 1-percent pilocarpine nitrate, may be instilled regularly at bedtime, and this usually is sufficient, although the reason why is beyond our ken. Here, as in preglaucoma of the acute type, the too-frequent use of too strong a miotic may be just as damaging as the complete neglect of the miotic. This latter point must be impressed, especially upon neurotic patients who are apt to run to the pilocarpine bottle upon the slightest provocation.

Summary

Preglaucoma may be divided into two forms: that which may be the predecessor of an acute glaucoma, and that which may be followed by a chronic glaucoma. The two forms can be differentiated clinically and require different types of provocative tests for confirmation. When recognized, preglaucoma necessitates preventive treatment.

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SYNDROME OF UVEITIS, MENINGO-ENCEPHALITIS, ALOPECIA, POLIOSIS, AND DYSACOUSIA*

Report of a case due to Actinomyces

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Ophthalmologists recognize a syndrome of chronic bilateral uveitis in association with alopecia, poliosis, vitiligo, and dysacousia. The following report appears as a slight variation of this clinical entity. Duke-Elder[1] has presented a classical description of the usual syndrome with an excellent report on the literature. The senior author has seen two cases, both in adolescent individuals. The profound diseased state of the eyes is striking and once seen cannot be easily forgotten.

The uveitis is widespread and insidious, and generally begins in both eyes at about the same time. The exudative character of the choroiditis may lead to retinal detachments, and vitreous opacities increase gradually until an adequate view of the fundus is no longer possible. The usual sequelae of uveitis develop with or without treatment until a pigmentary atrophy is prominent. Following the severe inflammatory process the signs of uveitis gradually abate, often with permanent irreversible changes and considerable destruction to the ocular tissues.

Alopecia areata involving the hair of the head, eyebrows, and lashes frequently occurs in a matter of weeks after the uveitis. Poliosis (whitening of the hairs) occurs in a high percentage of cases.

Duke-Elder[2] states that vitiligo and temporary deafness, lasting four to six weeks, occur in about half of the cases and come on soon after the eye symptoms. Hamada[3] appears to have been among the first to call attention to the central-nervous-system involvement with headache, vomiting, spinal-fluid lymphocytosis, and increased pressure. The disease is apparently self-limiting, although the course may be a matter of months.

The etiology of the disease has been given as unknown, and the treatment considered as entirely symptomatic. Toxic, virus, and allergic theories have been advocated.

Hague[4] has given an excellent review of the subject and has presented an additional case showing a transient encephalitis. The relationship between the neurodermatoses (alopecia, vitiligo, and poliosis) and the intraocular-pigment disturbance is noteworthy. The role which the hypothalamus plays in organic-pigment disturbances of this nature is well presented by the aforementioned writer. That the encephalitis might affect retino-hypothalamicohypophysial vegetative fibers which control pigment seems likely. In a case of a tumor of the third ventricle[5] pressing upon the hypothalamus, similar diffuse pigment disturbances were noted. There is good evidence that any irritative action in this region of the hypothalamus may produce this spotty depigmentation.

Hague also draws attention to the similarity of the uveitis syndrome and sympathetic ophthalmia with respect to symptoms and histologic features. There is some evidence for a virus etiology for both ocular conditions but substantial proof has been scant.

In Givner's[6] case, aqueous and iris tis-

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sue produced no virus growth in a series of chorioallantoic and yolk-sac inoculations. He cites several other workers who have had inconstant success with the production of optic neuritis and uveitis from the inoculation of vitreous from affected eyes. No microörganisms were found in the ocular fluids or tissues.

Carrasquillo[7] has reported carefully on 29 cases which included all the cases other than those tabulated by Koyanagi in 1929. He concluded that a neuropathic factor of sympathetic activity was operative in the uveitis syndrome.

Rosen[8] found the syndrome of bilateral uveitis, alopecia, poliosis, vitiligo, and dysacousia described in the literature 47 times. He states that the Vogt-Koyanagi syndrome always occurs in darkly pigmented persons. In analyzing the 47 cases for the extraocular signs he reports that alopecia occurred in 31 of 40 cases, poliosis in 43 of 47 cases, vitiligo in 30 of 47 cases, dysacousia in 24 of 44 cases, and cephalgic symptoms in 21 cases.

Hamada[9] observed 10 cases of acute diffuse choroiditis (Harada's disease), which was first described by E. Harada. However, Hamada states that often these cases were accompanied by meningeal symptoms; that is, headache and lymphocytosis in the cerebospinal fluid. Vestibular, cochlear, skin, and hair changes were also noted. The uveitis in all cases was diffuse, without distinct nodular formation. The fundi first exhibited localized multiple retinal swellings due to edema, especially distinct about the disc and macula. In a few days the edema fused and a distinct neuroretinitis could be observed. In 7 of the 10 cases a retinal detachment was present. These fundus changes disappeared gradually after two or three months, leaving a fine mottling in the fundi. The central nervous system, vestibular, cochlear, cutaneous, and hair manifestations were observed either before, during, or after the ocular symptoms became apparent.

Hamada histologically examined those eyes with this form of acute, diffuse choroiditis. He found the proliferating modifications of the uvea manifested by gradual destruction of the pigmentary cells (chromatophores). Pigmentary granules were frequently found in the epithelioid and giant cells in a phagocytized form. After one to three months it was noted that the proliferating and exudative modifications had disappeared and the structures had become atrophic.

The distinction between acute diffuse choroiditis (Harada) and the syndrome of uveitis, vitiligo, poliosis, alopecia, and dysacousia (Vogt-Koyanogi syndrome) with or without meningo-encephalitic signs does not appear clear cut.

On the other hand, the clinical appearance of sympathetic ophthalmia compared with the uveitis in the syndrome of alopecia, vitiligo, poliosis, and dysacousia is striking.

Exudative retinal detachments, poliosis, and deafness have been noted as occurring in sympathetic ophthalmia. Systemic symptoms indicating meningeal involvement have also been observed in sympathetic disease (Snellen,[10] Risley,[11] and Luque[12]).

It would appear that there is a common denominator in all three forms of this chronic uveitis.

The following case report of uveitis in association with meningo-encephalitis, alopecia, poliosis, and dysacousia illustrates the profound effect that the disease has upon the eyes as well as on certain other systems. The clinical appearance of the eyes might easily pass as sympathetic ophthalmia and perhaps it may be but a variation of this condition.

The recovery of Actinomyces in this case was so clearly proved to us, both from direct smear and animal inocula-

tion, that we felt it was worthy of report.

Sympathetic ophthalmia has been explained as an anaphylactic phenomenon through sensitization to the uveal pigment. It is suggested that in our case the organism, Actinomyces, began the ocular inflammatory state which resulted in uveal-pigment destruction. The liberated pigment antigen may have then initiated the anaphylactic process which resulted in further pigment break down in the eyes, hair, skin, and ears. If it is true that some pigment[13] occurs in the basilar membrane of the labyrinth, then disturbance of this pigmented structure could explain the dysacousia.

The idea that the liberated iris pigment sets the stage for the anaphylactic process which results in a severe bilateral uveitis is not new. The missing link in the puzzle has been what liberates the pigment. In the nontraumatic form of this severe uveitis it has been found that Actinomyces can at least act as one of the initial causative agents. The uveitis in this syndrome may be likened to a nontraumatic form of sympathetic ophthalmia.

Case report

The patient, a Puerto Rican soldier, aged 19 years, was first seen as an outpatient at an overseas general hospital about January 1, 1944, complaining of a severe frontal headache and loss of appetite. His familial and past personal history were unrevealing except that the patient stated that he had been bitten by a scorpion about two weeks prior to the onset of his symptoms. About January 6th the headache lessened, but soreness of the left eye and blurred vision were experienced. Two days later soreness and blurred vision of the right eye were noticed. His visual loss steadily increased, so that in a few days he was unable to read. He stated that his vision was normal on entry into the Army. Chills, nausea, vomiting, and dizziness developed, and he was admitted to the hospital on January 14, 1944.

Physical examination. Examination on admission revealed dilated pupils which responded poorly to light. The scleral and conjunctival vessels were moderately congested, and there was a horizontal nystagmus on left lateral gaze. The disc margins were reported as indistinct, and the retinal veins appeared congested. There were no hemorrhages nor exudates. The nasopharynx was moderately congested. The remainder of the general and neurologic examination showed no abnormal alterations. The temperature was 97°F., and the respiratory rate was 18 per minute. The blood count was 4,520,000 red blood cells; 8,700 white blood cells; hemoglobin 85 percent; polymorphonuclear leukocytes 72 percent, and lymphocytes 28 percent. Urinalysis was normal.

Course in the first hospital. The patient's condition seemingly improved after admission to the hospital. The appetite increased, vomiting ceased, and he became ambulatory. The temperature remained between 97° and 98°F.

Two days later he again vomited. Inspection of the fundi on January 17th showed a bilateral papilledema. A lumbar puncture yielded clear fluid under 12 cm. of water pressure. There were 215 cells per cu. mm. and they were all reported as lymphocytes. The spinal-fluid sugar was normal, but the globulin was slightly increased. X-ray studies of the sinuses showed hazy antra, bilaterally. The maxillary sinuses were irrigated. The fluid return from the left antrum was clear, but that from the right was of a dark straw color. The culture from the right antrum showed hemolytic Staphylococcus aureus. On January 23d a bilateral, inferior retinal detachment was noted. The nystagmus on left lateral gaze persisted,

but otherwise no additional neurologic findings were uncovered. Vision was 20/200 O.U.

The senior author first saw the patient in consultation on February 9th. The presence of bilateral, inferior symmetric retinal detachments was confirmed. There were many small, discrete, yellow and grayish spots in the periphery of both fundi which appeared to be multiple areas of focal chorioretinitis. There was an optic neuritis, bilaterally, measuring approximately 2D. elevation. The slit-lamp showed many keratitic precipitates and cells in the aqueous, bilaterally. The ocular picture alone resembled a bilateral, subacute neuroretinitis and uveitis with retinal detachments. The symmetry of the detachments was striking. The vision continued to become obscured because of the haziness of the media. The patient was given a course of sulfadiazine for eight days and then seven intravenous typhoid injections. The latter gave excellent fever responses. Four more spinal-fluid analyses were done, and the cell counts (reported as lymphocytes) ranged from 214 to 142 on March 3d. No polymorphonuclear cells were ever noted. Aside from a persistent slight increase in the globulin, the cultures, Wassermann tests, gold curves, and Queckenstedt's sign were repeatedly negative. The blood counts remained nearly the same as on the first examination; the white blood count rarely was found to be above 8,000. A blood culture showed no growth. Two sedimentation rates were identical at 3 mm. in one hour. Two bloool-serum specimens were negative for lymphocytic choriomeningitis. Blood smears failed to show malaria parasites or microfilaria. Stool examination showed no parasites or ova.

Course in the second hospital. The patient was transferred to Gorgas Hospital, Ancon, Canal Zone, on March 30, 1944. Ocular examination showed that the haze in the media had increased markedly. Vision was: O.D., perception of hand movements at one foot; O.S., finger counting at two feet. Keratitic precipitates and cells in the aqueous were seen in profusion. The elevation of the retinas could still be observed.

No new neurologic changes had been added at this time. Spinal-fluid cell counts

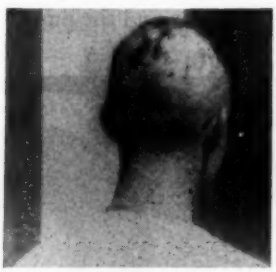


Fig. A (Harley and Wedding). Alopecia as noted at the end of 3½ months of illness.

on April 3d and 6th showed 30 and 20 cells present, respectively. Other spinal-fluid examinations, including cultures, were negative. Examinations for toxoplasmosis were negative.

By April 15th the retinal detachments were seen to have reattached, although the view was very poor, indeed. On April 25th, after approximately 3½ months of illness, several large areas of alopecia on the scalp were noted (fig. A) and it was at this time that the syndrome of uveitis, alopecia, poliosis, and dysacousia with meningo-encephalitis was diagnosed.

X-ray films of the skull were negative; of the chest and hands were negative for Boeck's sarcoid. The antra continued to show thickened membranes with straw-colored fluid returns and were treated by Proetz displacement. No vitiligo had been noted, even under ultraviolet-light inspection. The alopecia developed rapidly, and by May 1st the patient was three-fourths bald. Approximately half of the hairs of the eyebrows and eyelashes became white

in a few weeks. Spinal fluid and aqueous-chamber fluid were withdrawn and injected into laboratory animals (rats) on April 15, 1944. Tinnitus was complained of by May 1st. Audiograms done in April and June were within normal range, but in September another audiogram showed a definite nerve-type deafness.

Although atropine had been used topically for months the irides became plastered to the lenses and the pupils remained in mid-dilatation. Secondary glaucoma developed in the left eye but was controlled by paracentesis. Later both eyes remained in hypotony.

By June 1st the hair on the head was beginning to return, but one quarter of it came back white. Treatment over a period of nine months at Gorgas Hospital has consisted chiefly of administrations of penicillin (400,000 U.), intravenous typhoid, heavy doses of salicylates, diathermy, and topical atropine. No treatment has been of any avail.

An eye examination on November 6, 1944, showed a moderately deep scleral injection, especially about the limbus. There were seclusio pupillae and extreme iris atrophy, since light concentrated on the sclera was easily seen through the muddy brown irides. Vascularization of the iris was prominent, but no nodules were present. A heavy gelatinous exudate hung over the pupillary area, and membranes had grown over both anterior surfaces of the lenses. The keratitic precipitates had diminished in number. Both eyeballs were soft to palpation. In the pupillary center of each cornea in Bowman's membrane was an irregular, yellowish, foamy collection appearing as an early degenerative corneal change, possibly an early band-shaped opacity.

In November 9th and December 28th the spinal-fluid cell count was 3, all of which were lymphocytes. The spinal-fluid glucose was 72 mg. per 100 c.c. and sodium chloride was 745 mg. percent. An electrocardiogram was normal. The basal metabolic rate was +6. Blood serum failed to agglutinate stock cultures of Brucella abortus in any dilution. More fluid was aspirated from the aqueous chamber of both eyes for further laboratory study on November 6th. Ocular examination on January 23, 1945, showed an increase in the band-shaped opacity in both corneas (fig. B). It was more dense and had assumed a chalky white color and completely replaced Bowman's membrane in the lower third of the cornea. The gelatinous exudate in the aqueous had largely disappeared, but many keratitic precipitates remained. The irides, synechiae, and cataracta complicata were unchanged. Light projection was some-

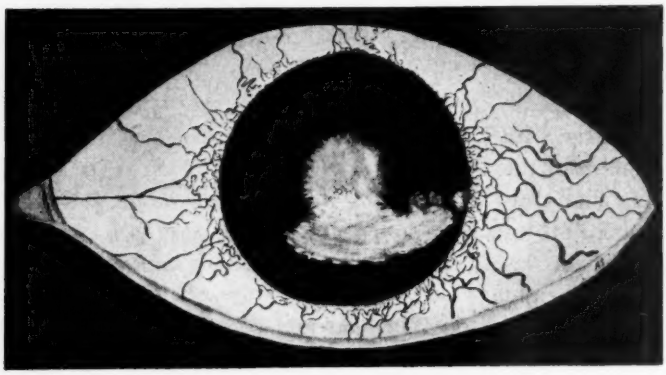


Fig. B (Harley and Wedding). Reproduction of left eye after one year of illness. Note the posterior synechia, secondary cataract, flattening of the iris pattern, and neovascular formations on the diseased iris. The cornea is the seat of a bandlike opacity.

what faulty. There were two areas of alopecia, with graying hair returning in the lower occipital region.

The patient had suffered from a chronic rhinitis, catarrhal ethmoid, and maxillary sinusitis accompanied by a eustachian-tube obstruction since hospitalization. Allergy tests with 19 common allergens were made but only pyrethrum was moderately positive. Skin tests for coccidioidin,* histoplasmin,* and tuberculin in both first and second strength were all negative.

Since the patient would require a long convalescence, he was sent to the continent for further disposition. It is anticipated that cataract extractions may be attempted when the ocular inflammation has fully subsided.

Bacteriology and Mycology†

The aqueous humor from each eye was withdrawn in sterile syringes and each placed immediately in a sterile test tube. Similar precautions were taken with the spinal fluid. The following condensed report of the laboratory findings is given:

Direct smear from eye. The grossly cloudy and somewhat granular-appearing fluid aspirated from the anterior chamber of both eyes showed on direct smear diffuse areas with innumerable small coccoid and small rodlike structures. They were predominantly of a purple color but also of basophilic appearance with Giemsa's stain. Some forms were spherical in contour and measured about 2 micra in diameter. A few bodies showed a definite budding form and measured about 2.0 by 4.7 micra at the largest dimensions (fig. 1). Two photographs showing mycelial elements recovered from the aqueous humor directly and from the culture of the meninges of an inoculated rat will be shown in another paper. Some purple and basophilic staining round bodies and rodlike structures appeared to be within the acidophilic staining cytoplasm of some of the cells. These cells had large basophilic staining, vesicular nuclei. A few slighty basophilic staining and septate nonbranching mycelial filaments were observed. Basophilic amorphous precipitate was also seen. Control smears for foreign material in stains showed no such similar structures.

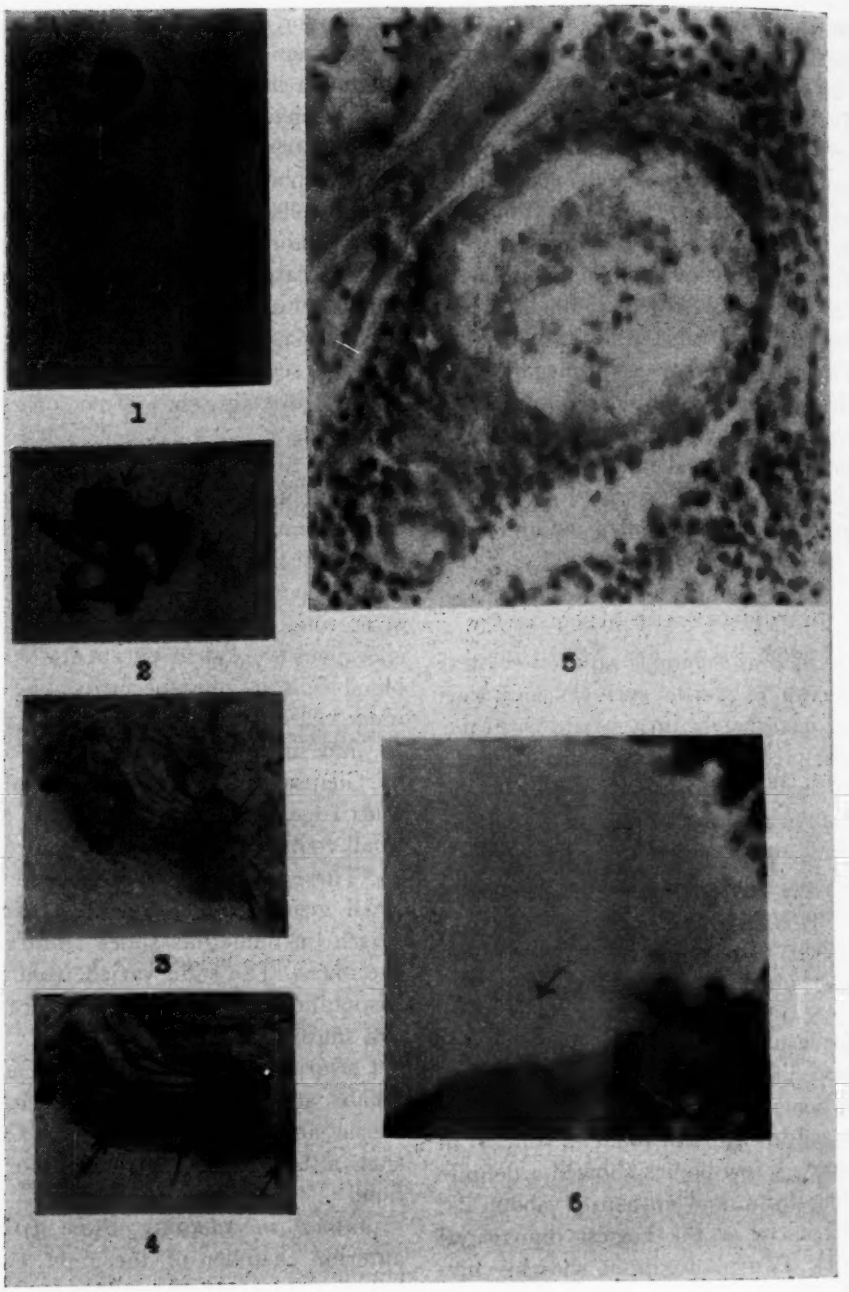
Direct examination of spinal fluid. Unfortunately, the spinal-fluid specimens were examined late in the course of the disease in this laboratory. The heavy turbidity reported at a previous hospital was at no time observed here. All spinal-fluid specimens were clear except for some red blood cells in one specimen. The maximum cell count was 30 lymphocytes per cu. mm. in the clear fluid. Smears stained by Giemsa's method and prepared from centrifuged specimens showed a few small rodlike and coccoid structures (fig. 2). These forms occurred isolated and in small groups and necessitated extensive search on numerous slides from various specimens. The stain varied from a deep basophilic to a purple appearance. Control smears were negative.

Cultures. Cultures from both aqueous humor and spinal fluid specimens were sterile aerobically and under CO_2 tension, although they were held for some time.

Animal inoculations. Fluid from the anterior chamber of the right eye was inoculated intraperitoneally into a female rat (no. 1) on April 15, 1944. The rat was killed October 8, 1944, and showed grossly mesenteric nodular structure, not recognized as any definite organ (fig. 9 a.). Numerous small pus pockets were situated over the surface.

*The coccidioidin and histoplasmin antigens were furnished by J. F. Kessel and C. W. Emmons, respectively.

†Acknowledgement is made to Dr. H. C. Clark of Gorgas Memorial Laboratory, R. de P., for use of photomicrographic equipment.



Figs. 1-6 (Harley and Wedding). Photomicrographic studies.

Fig. 1. Budding structure, as observed by Giemsa staining of direct smear from aqueous humor of the eye (×950).

Fig. 2. Rods (see arrow) and coccobacilli, stained by Giemsa's method, the direct smear from spinal fluid of patient (×950).

Figs. 3, 4. Cocci at different focus levels, as observed in hyalinized mass of cerebral cortex of rat no. 2 inoculated with spinal fluid of patient (×950; H. & E. stain).

Microscopically the mass was shown to consist of uterus, tubes, and ovaries, with focal and diffuse areas of inflammatory reaction over uterus and tubes and within the lumina of the tubes (fig. 7). Basophilic-staining cocci, diplococci, cocci in chains, and occasional diphtheroid structures were observed predominantly in the serosal exudate (fig. 8). A few cocci were seen within the lumina of the fallopian tubes and a few others were within polymorphonuclear leukocytes.

Spinal-fluid specimens of April 3 and 6, and of May 5, 1944, were all inoculated intraperitoneally into a second rat (no. 2) which was killed on June 30th. Uterus, tubes, and ovaries showed an irregular mass resembling the same structure described for rat no. 1 (fig. 9 b). No pus pockets were present over the external surface of this structure; but surfaces made by sectioning showed small pockets containing a yellow, viscid, and purulent-appearing content. The meninges presented a small, soft, gray nodule, the size of a small pinhead. Direct observation on a preparation from this nodule showed a few small rodlike structures.

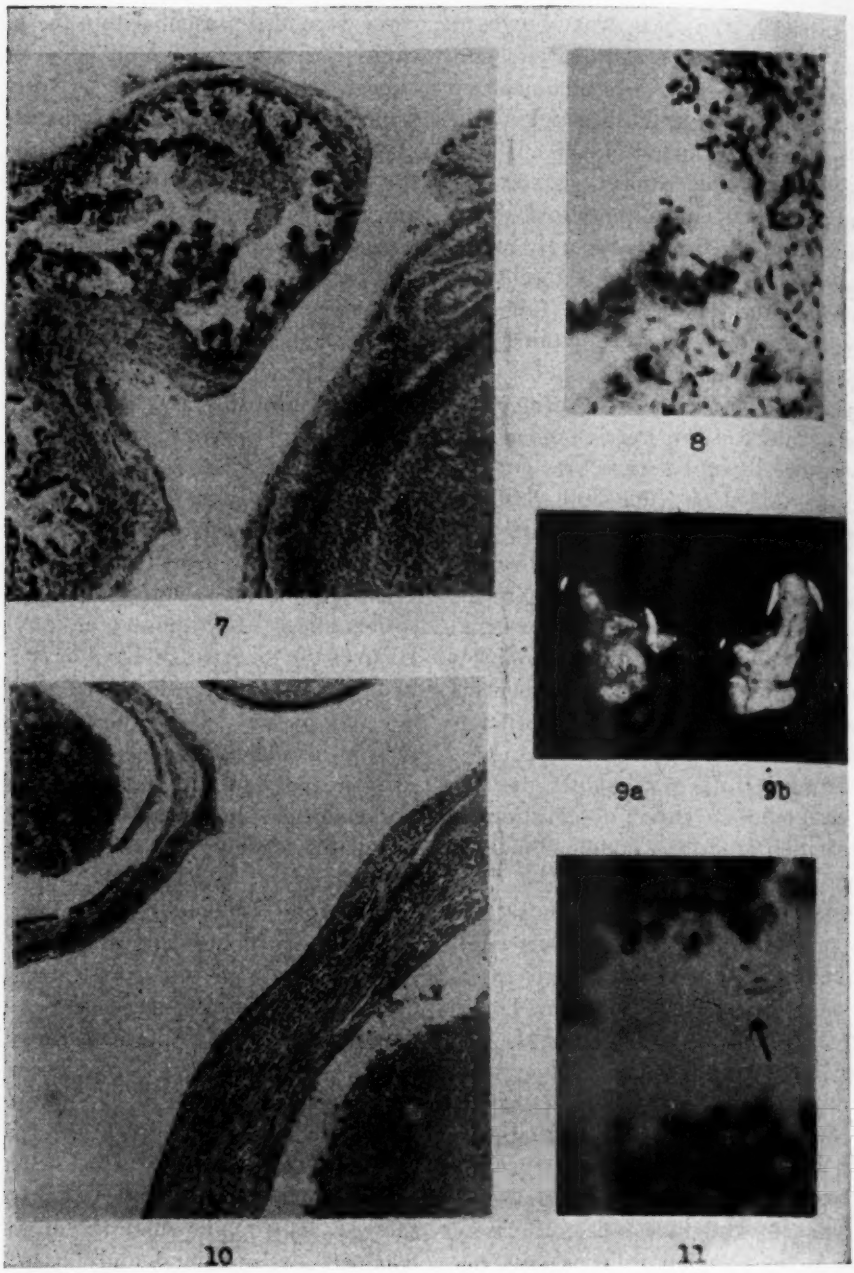
Microscopic examination of a section of the lung presented a small abscess well walled off adjacent to some blood vessels and somewhat distant from the larger bronchial ramifications (fig. 5). The uterine cavity and lumina of the tubes were dilated and filled with inflammatory cells (fig. 10). Only a few microörganisms in the form of diphtheroid structures of basophilic staining were seen within the lumina of the tubes, uterine cavity (fig. 11), and ovarian follicles (fig. 6). Occasional basophilic cocci and diplococci were also present within the uterine cavity. An adjacent lymph node showed almost complete loss of architectural structure with focal areas of abscess formation. A section of the brain showed on the surface of the cortex a small zone of an eosinophilic-staining hyaline mass containing several basophilic-staining cocci and occasional diplococci (figs. 3 and 4).

A third rat was inoculated cisternally on November 6, 1944, with aqueous fluid aspirated from both eyes. This rat died in 24 hours, probably as a result of trauma to the central nervous system.

Cultural characteristics. Cultures were made aerobically and under CO_2 tension on Sabouraud's medium, blood slants, and in hormone broth. All aerobic cultures from both animals were sterile. Cultures grown under CO_2 tension from pus pockets over the external surfaces of the tubes and uterus of the rat inoculated with aqueous humor showed the same characteristics as the cultures grown under CO_2 tension from brain, meninges, and pus pockets of the uterus and tubes of the rat inoculated with spinal fluid. These cultures grew on blood slants and in hormone broth. Colonies varied from pinpoint in size up to pinhead. They were soft and of a gray to a gray-brown color. Sabouraud's cultures were sterile. In 24 hours the predominating structures were cocci, diplococci, and streptococci that took the gram stain variably but for the most part gram positively. Occasional filaments were observed after 48 hours. In 72 hours cultures under CO_2 tension showed acidophilic-staining branching filaments and predominantly basophilic-staining rods in addition to the forms de-

Fig. 5. Lung abscess with circumscribed tissue reaction of rat no. 2, inoculated with spinal fluid of patient (×400; H. & E. stain).

Fig. 6. Rods within follicular cavity of ovary of rat no. 2 inoculated with spinal fluid of patient (×950; H. & E. stain).

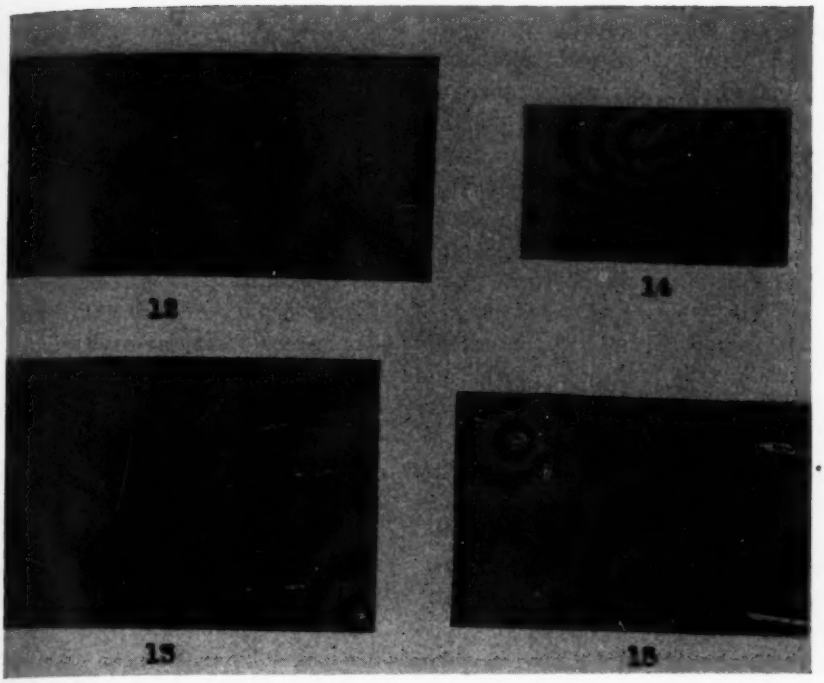


Figs. 7-11 (Harley and Wedding). Gross and photomicrographic studies.

Fig. 7. Microscopic section of fallopian tube and uterus of rat no. 1 inoculated with aqueous humor of eye (×75; H. & E. stain).

Fig. 8. Coccal, diplococcal, streptococcal forms and rods as seen in serosal exudate of Fig. 7 (×950; Gram's stain, MacCallum's modification of Goodpasture's method).

Fig. 9 a. Gross specimen of uterus, ovary, and tube of rat no. 1 inoculated with aqueous humor of eye (×1¼).



Figs. 12-15 (Harley and Wedding). Photomicrographic studies.

Fig. 12. Coccal and streptococcal forms of 48-hour culture on blood slant under carbon-dioxide tension, from meninges of rat no. 2 inoculated with spinal fluid of patient (×950; H. & E. stain).

Figs. 13, 14, 15. Rods and branching filamentous forms from 72-hour growth on blood slants under carbon-dioxide tension from meninges of rat no. 2 inoculated with spinal fluid of patient (×950; H. & E. stain).

scribed (figs. 12-15). Some of the rods presented a resemblance to the morphologic appearance of those found in direct smear of the spinal fluid of the patient. Twenty-four-hour transplants of cultures grew but died within 72 hours, and further observations of developmental characteristics were not possible.

Correlation of findings. It is already well established that most pathogenic forms of Actinomyces are microaerophilic and that some of the pathogens in this group are aerobic. There are various references in the literature that club formations are neither a criterion for, nor diagnostic of, Actinomyces. Emmons[14] considers actinomycosis as an infection caused by invasion of the host by some of the species of Actinomyces. He also makes reference to variations of abnormal forms of this organism in culture. Kessel and Goolden[15] refer to the diagnosis of actinomycosis by branching filaments and bacillary forms. The difficulty experienced in

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Fig. 9 b. Gross specimen of uterus, ovary, and tube of rat no. 2 inoculated with spinal fluid of patient (×1¼).

Fig. 10. Microscopic section of fallopian tube and uterus of rat no. 2 inoculated with spinal fluid of patient (×75; H. & E. stain).

Fig. 11. Diphtheroidlike structures among inflammatory cells within uterus of rat no. 2 inoculated with spinal fluid of patient (×950 magnification of section of fig. 10; H. & E. stain).

culturing the microaerophilic pathogenic forms of Actinomyces with subsequent loss of culture is a common occurrence. Pus from actinomycotic lesions that has been cultured on artificial media frequently shows no growth. The morphologic structures of actinomycetes simulating cocci, streptococci, and rods, together with branching filamentous forms, as is observed in the various developmental stages of the organism, have repeatedly been mentioned in literature. Novak and Henrici[16] and Sartory and Meyers[17] refer to a filterable form of the actinomycetes. Negroni[18] refers to the flexed bacillary forms and the undulant filaments with short ramifications.

The organism recovered from the various lesions of the inoculated animals described in this paper has been classified as one of the species of Actinomyces, due to the observed developmental stages terminating in branched mycelial elements. It is important to note that specimens taken from the aqueous and spinal fluid when injected into separate animals produced a similar gross and histologic appearance of the involved structures with the recovery of the same organism from each of the two animals.

All specimens used for cultures and animal experimentation were handled only by the authors with utmost precautions to prevent contamination of specimens. Test tubes and syringes were sterilized twice immediately before being used. Aqueous humor aspirated from the eyes remained in the respective syringes and the syringes were immediately placed in sterile test tubes. No intermediary containers were used. Within a brief time the fluid was inoculated on media, into a rat, and placed on a slide for a smear which was protected in a sterile Petri dish. Spinal-fluid specimens were handled with equal care and precautions. Control smears were made for the presence of possible contaminants in the stain. Fresh culture media were incubated 24 hours before being inoculated in order to guard against possible contamination in the process of making slants.

It is impossible to say from direct smear alone that a certain early stage of development of an organism is a particular organism. This can be done only by following the development of that organism and by observing its classified characteristics. The developmental stages of the Actinomyces mentioned in this paper will be discussed in somewhat greater detail in a separate paper.[19] Further work is being done on a strain of Actinomyces recovered from animal experimentation in another case of severe meningitis. The round bodies, sproutlike or budding forms, and other structures mentioned in this paper have also been observed in the aforementioned case in which the organism has been kept viable.

Summary

A syndrome of uveitis, meningoencephalitis, alopecia, poliosis, and dysacousia with the case report is presented.

This syndrome is probably closely allied to that form of uveitis ordinarily associated with alopecia, poliosis, vitiligo, and dysacousia.

A brief account of the reviewed literature is given.

Actinomyces were recovered from the aqueous and spinal fluid and studied by direct smear, animal inoculation, and culture.

It is suggested that Actinomyces from the aqueous in this case initiated the pigment liberation from the irides which resulted in pigment sensitization of the uveal tract and possibly other pigmented structures.

The fact that the organism was similarly obtained from the spinal fluid presents the possibility that the pigmentary

disturbance was of central origin in the region of the hypothalmus.

The clinical resemblance between the uveitis in this syndrome and in sympathetic ophthalmia is striking.

Gorgas Hospital.

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BILATERAL UVEITIS WITH RETINAL DETACHMENT, POLIOSIS, ALOPECIA, AND DYSACOUSIA

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On May 22, 1944, Mrs. I. S., 42 years old, white, a resident of New York City, presented herself with the complaint of difficulty in reading small print. She had never used glasses; her general health was good, she stated, except for a recent allergic dermatitis of the lids, due to cosmetics, which her dermatologist was treating.

Examination was entirely negative except for a few cells in the aqueous of each eye, more in the left. Vision O.D. was 20/25 improved to 20/20 with +0.25D. sph. ⊂⊃ +0.50D. cyl. ax. 90°; O.S. 20/30 improved to 20/20− by +0.50D. sph. The patient read the smallest print by the addition of +1.25D. sph. to each lens. However, the few cells in each anterior chamber as seen with the slitlamp could not be explained, inasmuch as both eyes were white, there was no photophobia, and no ocular complaints other than the difficulty with near vision. The intraocular pressure in each eye was 18 mm. Hg (Schiøtz).

The patient was put on 1-percent paredrine thrice daily, so as not to interfere with her accommodation and thus allow her to continue with her work as a secretary. When she was seen again, four days later, the cells in the aqueous had not increased, the vision was the same, but the fundi now showed an unusual picture. Both optic discs were hyperemic, the margins were fuzzy, and the lower half of each retina was quite yellowish. On the following day, the patient noticed "a big black spot" in front of each eye, and it was found that there was a central scotoma for colors in the right eye and an absolute central scotoma for colors and form in the left eye. The vision was O.D. 20/30 with +1.25D. sph. and O.S. 20/50 with +2.50D. sph.; the hyperopia had increased. There was still no anterior injection nor change in the cell content of the aqueous. The fundus picture was changing, however, and edema was present at both maculas.

Dr. Brandon found moderate involvement of the antra, and it was decided to have these opened. On May 30th, the day the patient was admitted to Manhattan Eye, Ear, and Throat Hospital, her vision was O.D. 20/60 with +3.50D. sph. and O.S. 20/60 with +5.00D. sph. She had been using atropine for the past week, and the pupils were well dilated. The edema of the retinas had advanced, causing an increase in total hyperopia of 3 diopters O.D. and 4½ diopters O.S.

On June 5, 1944, five days after the sinuses were opened, the visual loss and retinal edema had progressed, so that now a +5.00D. sph. was necessary for the right eye and +8.00D. sph. for the left eye to obtain 20/60 vision. Now, for the first time fine deposits were seen on Descemet's membrane with an increase of cellular contents in the aqueous of each eye. The margins of both discs were obscured, and the retinas were edematous and yellow; they bulged forward, so that one had the impression of looking into a funnel with the optic disc at the narrow end.

The patient was admitted with a tentative diagnosis of Vogt-Koyanagi syndrome to the Eye Service at Mt. Sinai Hospital, where thorough laboratory investigations could be carried out. When she was admitted on June 14, 1944, the findings were as follows:

Vision O.D. 5/200−, with +4.00D. sph., 20/70; O.S. 2/200, with +7.00D.

sph., 20/100−1. Hypotony was present in each eye. In the right eye were found slight ciliary injection, conjunctival hyperemia, many fine pigmented keratitic precipitates, 4 plus flare, numerous formed elements in the aqueous, pupil dilated and fixed (atropine). The pupillary margin of the iris presented numerous fine fibrinous posterior synechiae, and there were two small Koeppe nodules at the 3-o'clock position. The lens capsule was covered with a very fine dusting of fibrin and pigment particles, the lens showing only rare cortical spoking. The anterior vitreous showed many small colorless opacities. The fundus presented a marked vitreous haze and pronounced retinal edema. The left eye showed similar changes with more precipitates.

The history elicited on admission revealed that the patient had noted photophobia three months ago. For the past three weeks she had had a gradual loss of visual acuity of both eyes with rather frequent headaches. For the past few days visual difficulty in the upper fields was noted, with slight impairment of hearing.

Course. Several days after admission a symmetric bullous detachment of both retinas inferiorly was noted, but no tear was observed. A lumber puncture after admission showed 725 lymphocytes, with a total protein of 74 and a negative culture. At no time did the patient show meningeal nor any other neurologic signs. During her stay the spinal fluid gradually cleared of cells. Loss of hair and some loss of hearing also became apparent. The eyes showed little change except for increased haziness of the vitreous and decreased vision. However, for the last week of her stay there seemed to be some improvement despite a few days of exacerbation of symptoms. The patient had moderate ocular pain, malaise, and some fever. Both spinal fluid and aqueous were taken for virus studies and animal inoculations, the results of which are described by Dr. Lubkin as follows:

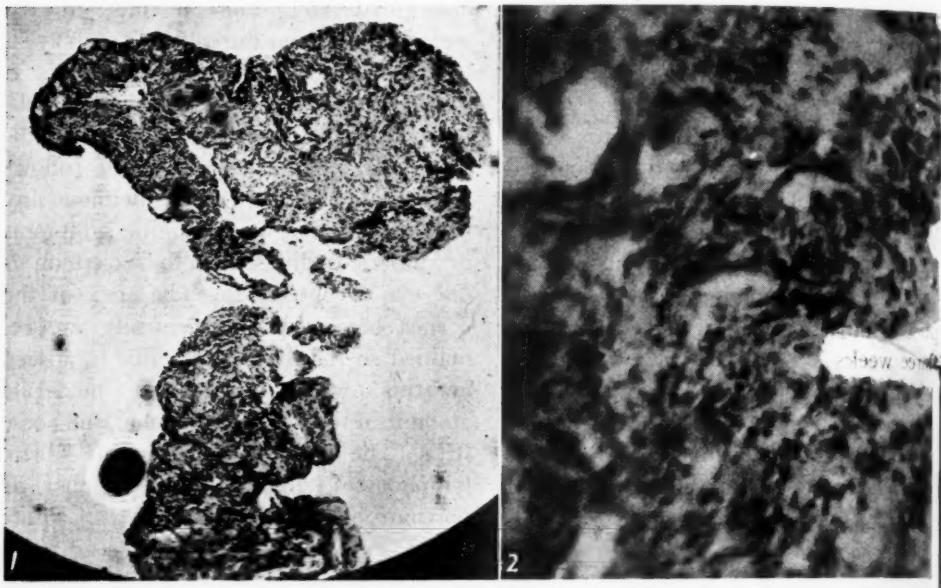
The procedure used was the inoculation of a mixture of 0.1 c.c. of aqueous with 0.5 c.c. of spinal fluid into the anterior chamber of a rabbit and two guinea pigs, the bathing of the scarified corneas of two mice (white) with the same mixture, and the injection of aqueous alone into the anterior chamber of one rabbit. All were done bilaterally. The amounts injected were 0.05 c.c. into the rabbits (each eye), 0.01 c.c. into the guinea pigs.

All animals were autopsied. One rabbit died within four days of a febrile illness. The others died within the following month (or were killed) without any suggestive ocular or meningitic symptoms or autoptic findings, with the exception of one eye of one mouse. The apex of the cornea became cloudy centrally and remained so for three weeks due to a deep keratitis with exudate in moderate amount in the anterior chamber and some iritis. The exudate consisted of fibrin, lymphocytes, and a goodly number of polymorphonuclear lymphocytes. There was likewise mixed cells in the adjacent cornea, which was slightly edematous. Nothing suggestive of inclusion bodies was observed even in the Giemsa-stained slides. The epithelium of the cornea seemed to have regrown in this region. The animal was otherwise asymptomatic. The impression was that the animal's keratitis was based upon secondary infection and that the entire series was negative. Dr. Schwartzman received specimens of aqueous and spinal fluid for virus studies and reported them as all negative. Cultures of the spinal fluid were negative; the serum showed no agglutinins against Brucella abortus and melitensis. The electron microscopy of the aqueous and spinal fluid showed no viruslike bodies.

Treatment. During the patient's stay at Mt. Sinai Hospital, the therapy was as follows: A full course of penicillin, 700,000 units over five days, was given. Four courses of maintained intravenous typhoid-fever therapy were administered, temperatures above 104°F. being maintained for at least four hours after each injection. Local treatment for the iritis and attention to foci of infection including the sinuses were continued. However, there seemed to be no definite response to any of these, and it was felt that the patient would have to sustain the natural course of the disease.

On August 18, 1944, the tension was 40 mm. Hg (Schiøtz) in each eye; the vision was O.D. 20/200, O.S. 20/400, not improved by glasses. There was moderate poliosis of the lashes of each upper lid, the eyebrows were entirely gone, with marked alopecia and grayness of the few hairs left on her scalp. There was no vitiligo and none was found at any time by Dr. Behrman even with the ultraviolet light, using Wood's method. The left globe was slightly injected, the pupils were irregularly dilated and adherent to the lens capsules, much pigment debris was on the capsules with many deposits on Descemet's membrane, and there was a cellular aqueous. The fundi were visualized with some difficulty, but one could observe that the areas of detachments below were quite flat and the retinal tissues here were washed out and thinned. A blood transfusion of one pint was given on August 30th.

On September 1st the tension was O.D. 43 and O.S. 50 mm. Hg. On September 8th a modified Lagrange operation with complete iridectomy was performed on



Figs. 1 and 2 (Laval). Excised iridic tissue from a case of Vogt-Koyanagi syndrome. The tissue is extremely necrotic so that it is quite friable and stains very poorly. There is a moderate amount of round-cell infiltration with an occasional plasma cell. Some hyaline degeneration is present, but there is no thickening of the vessel walls. No tubercles, giant cells, nor inclusion bodies are present.

the left eye at Manhattan Eye, Ear, and Throat Hospital; the histologic description of the excised iris is given in figures 1 and 2.

There was surprisingly little reaction to the operation, with only a small hyphaema which was absorbed rather quickly. Twelve days postoperatively the tension was O.S. 18 and O.D. 35 mm. Hg. The vision was O.D. 20/50 with −1.00D. sph. (no more plus lenses were necessary now that the retinal edema had subsided) and O.S. 20/400 not improved. The patient was given atropine daily for the left eye, no drops for the right. On October 3d another pint of whole blood was given by transfusion. On October 12th the tension was O.D. 55 and O.S. 15 mm. Hg. Pilocarpin 2 percent was given every two hours for the right eye, but the tension did not fall below 45 mm. Hg.

On November 9th a modified Lagrange with complete iridectomy was performed on the right eye, and there was no postoperative reaction at all. The iris tissue that was excised was similar to that obtained from the left eye. Due to allergic dermatitis from the atropine, scopolamine was ordered for both eyes and the tension continued at 15 mm. Hg, O.U. The patient gradually became allergic to scopolamine and 10-percent neosynephrin was given to be used once daily. By December 19th the vision was O.D. 20/50 with −1.00D. sph., and 20/200 O.S. with −0.75D. sph. The cells in the aqueous were diminishing, and the deposits were fewer. The fundi could be seen quite clearly and the reattached retinas were pale yellowish pink with irregular pigment mottlings. On February 7, 1945, the vision was O.D. 20/40 and O.S. 20/100; on May 10, 1945, it was O.D. 20/30−1 with −1.75D. sph., and 20/100 O.S. with −0.75D. sph. The patient read Jaeger 3 with a +3.25D. sph. add O.U. The eyebrows were slow in growing back, but the hair on the scalp had improved remarkably in color as well as in amount. The lashes were quite black again.

Comment

There have been many reports of uveitis associated with poliosis, dysacousia, alopecia, and vitiligo. Another report would have nothing to recommend itself except in so far as some new observations could be added. In this particular report there are at least two contributions of interest, one clinical, the other pathologic. The clinical observation is unusual in that the patient was seen so early in the course of the disease that the only abnormal finding was a few cells in the aqueous. The pathologic contribution consists of a study of the iris tissue of each eye of the patient. A possible third point of interest is the spinal-fluid findings and the studies made on the aqueous of one of the diseased eyes. This has been done before, but so infrequently that I believe only four other investigators have reported spinal-fluid examinations and only two others aqueous examinations.

Vogt was the first to call attention to the syndrome, but Koyanagi was preceded by several others. It is true that Koyanagi added dysacousia and alopecia, but the condition had been recognized and treated for some time before Koyanagi's paper appeared. One should not ignore the work of Gilbert, Elschnig, Erdmann, and Komoto. So-called Harada's disease is the same condition without involvement of the anterior uvea. And one should remember that not all cases have all the factors of the syndrome; one or more may be missing but still the diagnosis is made.

In 1910, Gilbert, in discussing his case, suggested that a herpetic lesion might be the causative agent. Investigators today are still looking for a virus as the possible etiologic factor. In 1911, both Komoto

and Erdmann supported Gilbert's theory when they discussed their own cases. In 1929, when Koyanagi presented his paper, he could add nothing to the etiology or the pathology, but he did add two additional signs to the synrome; namely, alopecia and dysacousia, which may occur in some of the patients. In 1930, Takahashi carried out some animal experiments and came to the conclusion that a virus was responsible, a concept possibly similar to that entertained for sympathetic ophthalmia or herpetic lesions; again no further advanced than Gilbert's concept in 1910. In 1939, Magitot and Dubois-Poulson had a case in which there were cells in the spinal fluid and "thought" it was due to a virus. In four of Takahashi's six cases the spinal fluids were positive; that is, they contained cells. Malbran and Muhlmann thought their case of Harada's disease was due to a "neurotropic virus" similar to the causative agent of herpes or sympathetic ophthalmia. In Salus's case grayish nodules were present in the iris, and he performed an iridectomy to relieve increased intraocular pressure, but he does not report an examination of the excised iridic tissue. Givner did report on the excised iris tissue and found evidence of chronic inflammation with an occasional eosinophile. Wexler's case was unique in that the vitiligo developed in a Negress and was quite extensive, but there was no complete laboratory examination.

The two recent attempts to isolate a virus, by Givner and by Hague, both proved to be fruitless as did the attempt in my case. I agree with Hague that the answer lies in the fact that we take the material from the patients too late in the course of the disease. In my case, the aqueous should have been used as soon as the retina began to look edematous, at least six weeks before it actually was used, and the same holds true for the spinal fluid. Hague's and Rosen's recent reports were all-inclusive and remarkable examples of thorough and painstaking clinical effort and literary research.

Inasmuch as the iris tissue shows no lesion characteristic of any particular type of infection, nor any evidence of local virus infection as we understand it today, we must admit that we are no further advanced in our understanding of this disease entity than we were 35 years ago. I doubt that pathologic examinations of an entire globe will throw any further light on the etiologic factor. The future advances lie in better and earlier methods of utilization of the pathologic fluids and tissues obtained from patients with this disease entity.

136 East Sixty-fourth Street.

THE INFLUENCE OF VEHICLES AND FORM OF PENICILLIN AND SULFONAMIDES ON MITOSIS AND HEALING OF CORNEAL BURNS*

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The extensive use of locally applied sulfonamides and penicillin on wounds has stimulated investigation of the effect of these compounds on the regenerative capacity of the injured tissues.[1-4] In a previous communication,[3] it was shown that although chemotherapeutic agents did inhibit the regeneration of corneal epithelium following burns and abrasions, some compounds (sulfadiazine and penicillin) caused practically no inhibition of the healing processes when applied in therapeutically useful concentrations. This conclusion was qualified by the form and vehicle in which the compound was administered; that is, powder, solution, or ointment. It was noted, for example, that sulfonamide powders were more detrimental to healing than lanolin-base ointments of the same compound. It appeared that the size of the particles of these powders might be an important factor contributing to the delay in healing. In addition, our earlier experiments showed that the frequent application of aqueous penicillin solutions (500 Ox.U./c.c.) to the abraded or burned cornea did not inhibit regeneration of the epithelium. Leopold and La Motte,[4] investigating the effect of penicillin solutions on the abraded rabbit cornea, came to the same conclusion. These authors demonstrated that the application of penicillin ointments, 500 Ox.U./gm. in carbowax base, produced a satisfactory concentration of this drug in the aqueous humor; however, no observations were made on the effect of penicillin ointments on regeneration. The use of penicillin ointments is becoming very extensive, and since it has been shown (Leopold,[4] Bellows[5]) that they produce a high concentration of the drug in the anterior portion of the eye, experiments were undertaken to determine the influence of penicillin, in ointment and also powder form, on the ability of epithelial cells to divide and migrate following extensive corneal burns.

The present communication, therefore, deals with the evaluation of: 1. several ointment and powder bases relative to their effect on healing; 2. the role of particle size of sulfonamide powders in the inhibitory effect these compounds have on wound healing; and 3. the effect of penicillin ointments and powders on the healing of corneal burns.

The influence of these drugs and vehicles was determined on both of the major processes involved in the healing of epithelial injuries, cell division, and migration. It has been shown that cell division is active during the period of cell migration following thermal burns.[3] The methods used were essentially the same as those reported earlier. Thermal burns of both corneas of rats were produced by the application of a Shahan thermophore (71°C. for 5 seconds). The terminal of the thermophore was shaped to fit the rat's cornea. The burn produced was a 1.5-mm. band extending horizontally

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from limbus to limbus. Bowman's membrane was left intact, but the epithelium was killed and sloughed away under the action of tears and lids in two to three hours. Normal healing was rapid, the defect being nearly covered in 12 hours and completely covered with epithelium in 15 hours. If both eyes were left untreated it was found that the injuries healed at an equal rate.

The average residual area of the right and left eye of the control burns varied only 7 percent, 12 hours after the injury was made. The material to be tested was applied to one eye once every two hours. The powders were applied generously and evenly so that the entire cornea was covered. Some residual powder was found in the lower conjunctival sac two hours after such an application. The ointments were also applied in excess, and the animal held for one minute after each application to permit the material to reach all parts of the conjunctival sac. In those experiments where the effect of a drug incorporated in a base was to be tested, the other eye was treated with the ointment base alone. Male rats of the Sherman strain, six weeks of age, and weighing 80-100 gm. were used. The operations were performed in the morning, and the eyes treated throughout the day. Twelve hours after the burn had been made the rats were autopsied and the eyes fixed for histologic study. Accurate camera-lucida drawings of the extent of the unhealed portion of the burn were made at this time and their area was determined by planimeter measurements of the drawings. The eyes were then sectioned, and the mitotic figures in the epithelium were counted. The number of figures in the treated and control corneas were compared, and the difference expressed in percent of the control eye. The number of mitotic figures found in bilateral untreated burns did not differ significantly in any of 12 cases studied, and the average of the group was only 0.8 percent. The mitotic-figure counts in the powder experiments were made from flat whole mounts of the cornea stained with Harris's hematoxylin. The fixative and stain were used as recommended by Buschke, Friedenwald, and Fleischmann.[6] After fixation, the corneas were dehydrated, stained, and mounted in Diaphane. The cedarwood oil step and mounting medium used by these authors were omitted; the counts were made in two to three strips extending across the entire width of the cornea and bisecting the band-shaped burn at right angles. The width of the strip of epithelium counted was outlined by an Ehrlich stop, aperture 4 mm. placed in the ×10 eye piece. A ×43 objective was used.

Experimental

The effect of particle size of three sulfonamides on epithelial regeneration was studied. The standard thermal burns were made on both eyes of a series of 32 rats, and sulfonamide powders were applied as aforedescribed, a very fine powder (<325 mesh) to one eye and a coarser (100-200 mesh) to the other. The coarser powders were the same size as those used in previous studies.[3] The fine sulfathiazole and sulfadiazine powders were the "microcrystals" of those drugs, and the fine sulfacetimide powder was obtained by grinding in a mortar.*

The previously reported inhibition of healing by sulfonamide powders was confirmed, but with sulfathiazole and sulfacetimide this inhibition was definitely less when fine powders were used (fig. 1). The results were very consistent, and favorable in 8 of the 10 pairs of burns

* Our thanks are due to Dr. E. Henderson and Schering and Company for the generous supply of sulfacetimide used in these experiments.

treated with the fine powder of each drug. The average unhealed area of burns treated with the coarser powders was 42 percent and 73 percent greater than in the burns treated with very fine powders of sulfacetamide and sulfathiazole, respectively.

Contrary results were obtained with sulfadiazine, for in these experiments the burns treated with the fine powders healed at a somewhat slower rate than did those receiving the coarser material. The difference in the healing of the coarse- and fine-powdered burns was not so great (−27 percent) as was found with the other drugs, and the difference was not statistically significant.

It is obvious that at least two major factors are involved in the delay to healing caused by these powders. One may be chemical and due to the nature of the compound itself, and another the mechanical factor of solid particles eroding the thin, freshly regenerated epithelium.

In order to determine the effect of the mechanical factor of particles, a series of burns was treated with fine powders of substances which were presumably nontoxic compounds. Calcium carbonate, zinc oxide, and lactose powders of particle size <325 mesh were used. They are relatively insoluble so that the osmotic pressure of the tears would not be greatly increased. In these experiments the powder was applied to one eye and the other left as an untreated control. All of these powders delayed epithelization (fig. 1); zinc oxide and calcium carbonate caused the most retardation. Lactose was the least harmful, having an inhibitory effect comparable with petrolatum. Calcium carbonate delayed healing to about the same degree as did finely powdered sulfacetimide, and the delay caused by sulfathiazole and sulfadiazine was comparable to that caused by lactose. It would therefore appear that the mechanical factors in these sulfonamide-powder applications are the main ones which inhibit healing.

The number of dividing cells in the regenerating epithelium was not affected by the application of lactose, $CaCO_3$, or

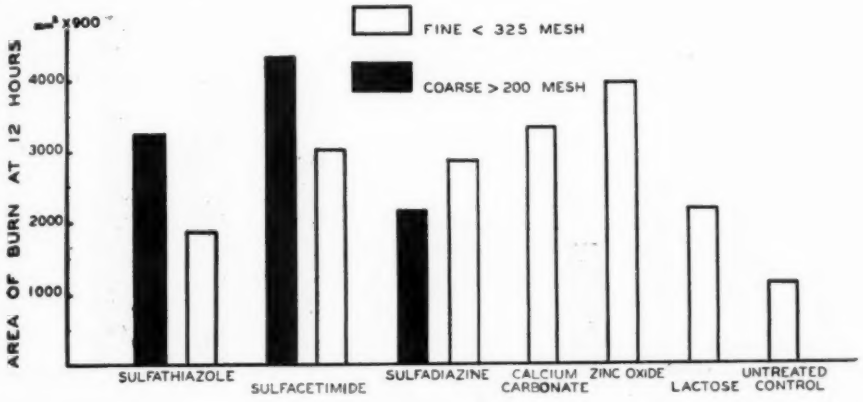

Fig. 1 (Smelser). The area, in sq. mm. ×900, of the unhealed portion of standard thermal burns treated with fine and coarse powders of sulfonamides and control substances. The fine and coarse sulfonamide powders were applied to the right and left eyes, respectively. The calcium carbonate, zinc oxide, and lactose powders were applied to the right eye of each animal, the left eye was the untreated control burn. Each column represents the average based on 10 or 11 experiments for each sulfonamide; 5 to 7 rats were used with each of the inert powders and 18 for the control burns.

ZnO powders. The difference in number of mitotic figures seen in the treated and untreated eyes was not greater than that found in a control series of bilateral untreated corneal burns.

These data suggest that sulfonamide ointments containing the drug as a finely divided powder suspension would not greatly delay healing. Ten-percent sulfadiazine and sulfathiazole ointments were prepared, using "Micraform" crystals (<325 mesh) in hydrosorb base. Bilateral standard thermal burns were made on the corneas of 12 rats. The sulfonamide ointment was applied to one eye and the ointment base to the other every 2 hours for 12 hours. Healing was delayed in both eyes of all animals; however, the delay in the sulfonamide-treated eyes was not much greater than in the eyes treated with the base. Sulfadiazine delayed healing slightly less than did sulfathiazole.

Ointment bases

Six ointment bases, suitable for ophthalmic use, were studied in the same manner as were the powders. Each base was tested on 5 to 7 pairs of corneal burns. Hydrosorb* and aquafor were used without the addition of water. Carbowax 1500 was selected because its consistency was suited to ocular application. A hydrous lanolin base was prepared by incorporating one part of a 1.5-percent NaCl solution in three parts anhydrous

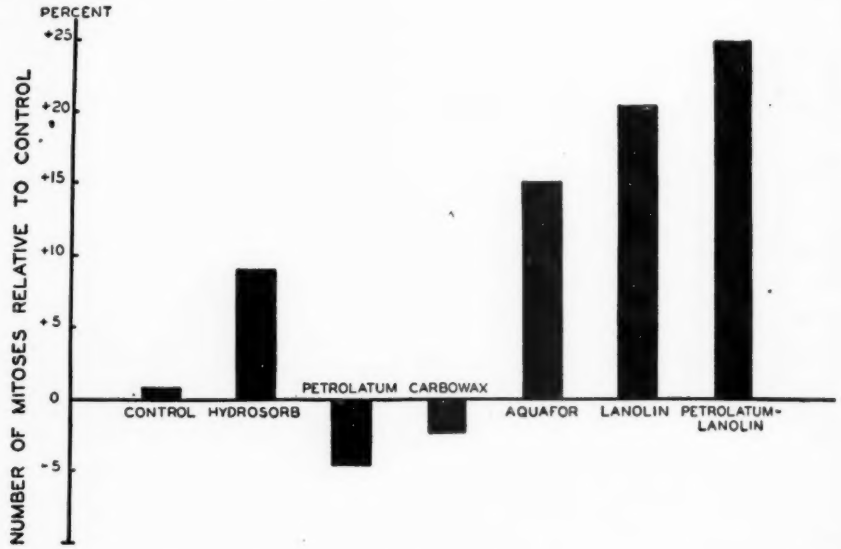

Fig. 2 (Smelser). The number of mitotic figures found in regenerating corneal epithelium treated with various ointment bases, 12 hours after a standard thermal burn. The difference in the number of mitotic figures found in the epithelium of the treated and untreated control eye of the same animal is expressed in percent of the control eye. The control bar shows the difference between the number of mitotic figures found in untreated burns of the right and left eye of the same animal. Each ointment was tested on 5 or 6 animals.

* Hydrosorb (Abbott) is a mixture of oleic acid ester and amide of diethanol amine, oleic acid, and white petrolatum. Carbowax compound 1500 (Carbide and Carbon Chemicals Corporation) is a polyethylene glycol. Aquafor (Duke Laboratories, New York City) is a mixture of petrolatum, wool fat, and cholesterol.

lanolin. The petrolatum-lanolin base consisted of 75-percent soft petrolatum, 20-percent anhydrous lanolin, and 5-percent 1.5-percent saline, by weight.

These bases appeared to be well tolerated by the burned eyes of the rats, except carbowax, which seemed to cause some discomfort. The animals made more effort to rid themselves of this material than of the others. Carbowax differed from the others because of its solubility in tears. An amount of carbowax which covered the eye and filled the conjunctival sacs dissolved in one or two minutes in the tears. It may be that the material itself stimulated tearing. Some difficulty was found in making petrolatum adhere to the ocular epithelia, but this was overcome by softening the petrolatum with the addition of a few drops of mineral oil.

None of the ointment bases interfered with cell division in the regenerating epithelium (fig. 2). There was a very slight average decrease in the number of mitoses seen in petrolatum- and carbowax-treated eyes, but this difference is without significance. The epithelia treated with ointments containing lanolin showed, on the average, more dividing cells than did the controls, but there was considerable variation between the individual animals. The increases found, 20-25 percent, are on the borderline of statistical significance.

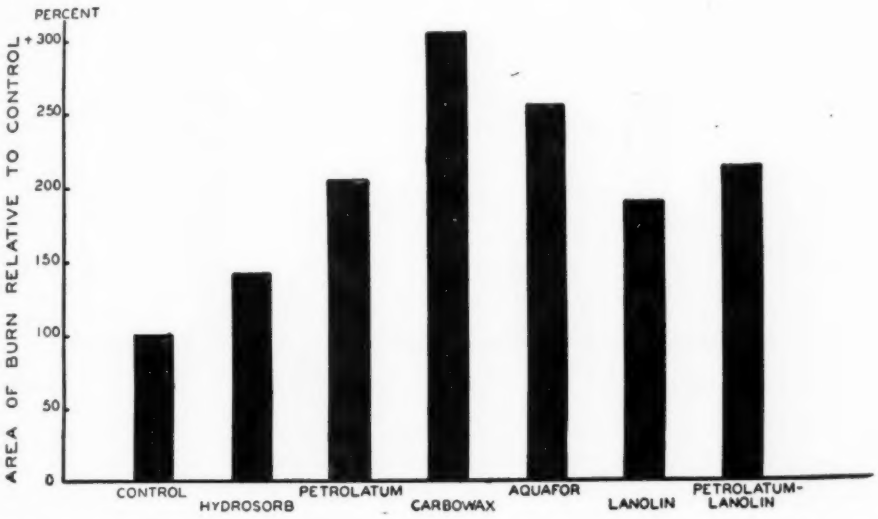

Fig. 3 (Smelser). The effect of various ointment bases on epithelization of corneal burns. The bars represent the unhealed area of the treated burns, 12 hours after the injury, relative to the area of the untreated control burn of the same animal. The area is expressed in percentage of the area of the untreated control burn which is represented by 100. Each bar is the average of 5 or 6 cases.

All of the ointment bases inhibited epithelization to some extent; however, some were far more harmful than others (fig. 3). Hydrosorb-treated burns healed the most rapidly. Petrolatum, lanolin, and their mixtures were moderately inhibitory; the unhealed portion of the burns treated with these ointments were twice the size of the untreated control burn at the 12-hour stage. Carbowax and aquafor inhibited epithelization the most; the residual burn area of these groups av-

eraged 2½-3 times that in the control eye. It is obvious upon reference to figures 2 and 3 that epithelization may be delayed in the absence of a decrease in mitosis. It is clear that hydrosorb possesses advantages in both its effect upon cell division and migration. Second choice of ointment material based on these factors would include lanolin and petrolatum. Carbowax appeared to be the least desirable on this basis. For these reasons, in the experiments with penicillin ointments, hydrosorb and petrolatum bases were used.

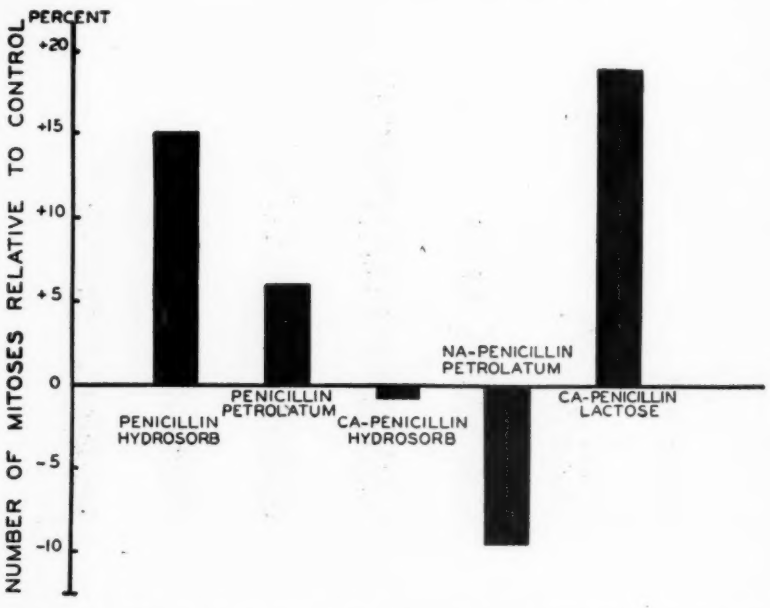

Fig. 4 (Smelser). The effect of penicillin in ointment and powder form on cell division in regenerating corneal epithelium. The number of mitotic figures is expressed in percentage of the number found in the control burn which received the ointment or powder base alone. Each bar is the average of 6 to 8 experiments.

Effect of penicillin ointments and powders on healing

All of the penicillin ointments were prepared to contain 1,500 Ox.U. per gram. Four preparations were tested. (1) Ca-penicillin (Squibb) was dissolved in one drop of water (ca. 50 mg.), and this made up to 1 gm. with hydrosorb. (2) Na-penicillin was finely ground in a drop of mineral oil with a glass rod; this fine suspension was thoroughly mixed with soft petrolatum to make the desired concentration. (3) Penicillin, in the free acid form,* was ground in a drop of mineral oil with a glass rod and then incorporated in petrolatum; (4) a preparation similar to (3) except that hydrosorb was used instead of petrolatum. The first ointment contained the drug in aqueous solution: in the last three the penicillin was dispersed in an anhydrous medium. In two cases soluble salts of penicillin were used, in the others the penicillin was in a lipid soluble form. Ophthalmic penicillin ointments of this type, but in another base, were introduced earlier (Von Sallmann

* We are greatly indebted to Dr. G. A. Harrop and Dr. Oscar Wintersteiner for the preparation and assay of the free acid penicillin used in these experiments.

and Meyer[7]). All ointments were freshly prepared for each experiment. In the present experiments the penicillin-containing ointment was applied to one burned eye, and the ointment base alone to the other. These four ointments were tested on 24 animals.

The effect of penicillin on mitosis in regenerating corneal epithelium was not marked; however, the number of dividing cells in the epithelia treated with acid penicillin tended to be slightly greater than in the controls (fig. 4). The Ca-penicillin was without effect. Three of the eight animals treated with Na-penicillin showed definitely fewer mitoses in the treated eye. The same ointments were applied to intact corneas of 14 animals once every hour, instead of at two-hour intervals. The frequency of mitotic figures was not significantly disturbed in any, but mitosis counts tended to be low in the Na-penicillin-treated eyes.

The rate of epithelization of burns treated with penicillin was extremely good (fig. 5). The burns treated with ointments of penicillin, or its salts, healed at essentially the same rate as the control burns treated with the ointment base alone. The average 12-hour-burn areas treated with penicillin or the calcium salt was smaller than that of the controls, but the difference was slight and should not be considered as evidence of stimulation. The unhealed area of the burns treated with the Na-salt ointments tended to be greater than in the controls, but this also is without significance.

Penicillin powders

These data show that penicillin does not interfere with the reparative processes when applied as ointments. The use of penicillin in powder form, to insure very high local concentration, has been suggested[5] and used clinically.[8, 9] Therefore, penicillin powder was applied directly to corneal burns. Both eyes of 14 rats were burned, and one eye in each case received a small amount (about 0.5 mg.) of penicillin powder every 2 hours for 12 hours. Eight rats were treated with Na-penicillin and six with the calcium salt. The powder dissolved in the surface film before the animals were released, so that there was no abrasive action of the powder on the regenerating epithelium. The results were extremely bad. The wounds did not heal; in fact, often a larger area of the cornea was denuded at the end of

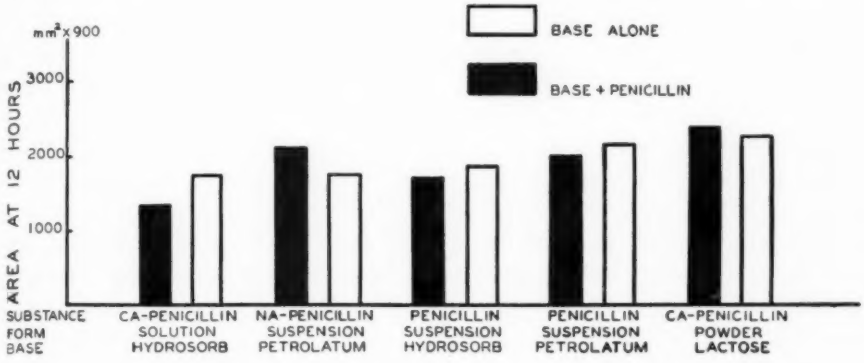

Fig. 5 (Smelser). The area, in sq. mm. ×900, of the unhealed portion of standard burns treated with penicillin ointments and powder. The areas were measured 12 hours after burning. Each preparation was tested on 6 to 8 animals.

the 12-hour period than was caused by the burn. No mitotic-figure counts were attempted. The penicillin powders were then appied to the intact corneal epithelium of six animals. In five of these there was definite destruction of the corneal epithelium. The corneas stained strongly with fluorescein, and sections showed that they had been extensively eroded down to Bowman's membrane. Mitotic-figure counts were made in one case in which the erosion was only superficial. The number of cell divisions was normal.

Obviously the use of penicillin powder undiluted is contraindicated. Ca-penicillin powder was thoroughly mixed with lactose (particle size <325 mesh) and the mixture made homogeneous by repeated sieving. Calcium penicillin was chosen because it is not so hygroscopic as the sodium salt, and the preparation available was a very fine powder. Each gram of lactose-penicillin mixture contained 30 mg. of Ca-penicillin or 28,000 Ox.U. penicillin per gram. The lactose-penicillin powder was applied to corneal burns of six animals. The control burns of the same animals were treated with lactose alone. The treatments were at 2-hour intervals, and the powders were applied over the entire cornea. The results (fig. 5) show that the penicillin-lactose powder did not delay epithelization more than did the lactose alone. Furthermore, the use of the very strong powders did not delay healing more than the application of such materials as petrolatum or lanolin.

The number of mitotic figures in these treated burns was also determined (fig. 4). The penicillin-treated eyes tended to have more cells in division than did the control eyes, but the difference was slight. Only one case showed definitely a greater number of mitotic figures in the treated epithelium.

Discussion

In determining the effect of therapeutic agents upon healing, many factors are involved. The accepted beneficial effect of the agent may be in part or entirely voided by damage inadvertently done to the healthy regenerating tissue. The damage may be caused either by the method of administering the drug or by secondary effects of the compound itself. Harm caused by physical factors in the method of administration can be avoided by changes in technique. Inhibition due to the drug itself can be avoided only by substituting another compound or by decreasing concentration or the speed with which the drug is released to the tissues.

The importance of physical factors is illustrated by the effect that particle size of sulfonamide powders had on epithelization of corneal burns. It seems likely that such physical factors are of particular importance in the eye. The action of the lids moving the particulate matter over the intact and actively regenerating epithelium would cause, as has been shown, considerable damage. The inhibition of healing caused by the large particles suggests that powders incorporated in ointment bases should also be very minute. The mechanism by which the coarser powders inhibited healing is not clear. They may erode the epithelium partly with the aid of lid action or they may actually block the forward movement of the cells over the denuded area. This latter does not seem probable, for the finest powders would do this as well. If actual erosion or the formation of minute injuries is involved, probably the shape of the particles would play a role. Another factor is the stimulation of tearing; the tears themselves may influence the processes of healing.

The physical and mechanical factors were obviously not the only ones involved in the inhibition of healing in these ex-

periments. Even though sulfacetimide was applied as a very fine powder it still delayed healing more than the other sulfonamides; likewise, zinc oxide was more detrimental than lactose. These differences may be due simply to the solubility of the compounds and the production of hypertonic media, or to some chemical action on the cellular metabolism.

The selection of suitable ointment bases for ophthalmic use is complicated by the many factors which must be considered. Obviously, the preparation must adhere well, hold the drug without destruction of its activity, and release it to the tissues in effective concentration. The effect of the base on wound healing is an additional factor. In the present experiments it is shown that some ointments delay healing much more than others, but all bases tested delayed healing to some extent. Without a single exception, every burn treated with any ointment base was at least a little larger than the untreated burn of the control eye at the 12-hour stage. In the case of hydrosorb and lanolin the mean difference between the treated and control eyes was not great; in fact, statistically insignificant. The presence or absence of water in the base does not seem to be of great importance, for the lanolin ointment was one-fourth water, and the hydrosorb anhydrous. The means by which ointment bases inhibit healing is not indicated by the present experiments. It is difficult to imagine that they physically block the movement of the cells, for no more than a surface film remained on the eye for any great length of time. Carbowax, which delayed healing the most, dissolved in the tears and appeared to be removed almost completely between applications. The solution of this base may have caused an unfavorable shift in the osmotic pressure of the fluids on the cornea. It does not seem likely that these varied bases were or contained substances toxic to the epithelium. It is also difficult to believe that they formed a film over the cells which would inhibit gaseous metabolism. The bases conceivably could absorb substances necessary to the healing processes and thus carry them away; however, there are no available data bearing on these hypotheses.

From a practical point of view it is clear that ointment bases alone may delay healing, but that some are less harmful than others. This observation is in agreement with the report of Leopold and Steele.[10] Therefore, a base should be selected from this group provided that it satisfies the other requirements outlined above.

The experiments with penicillin ointments confirm the result of our first series, that penicillin, in this form, was almost completely harmless to the reparative processes of the corneal epithelium. Application of the very strong ointments caused no detectable inhibition in the repair processes of either mitosis or cell migration other than that due to the ointment base. No real difference, in this respect, was found between the several ointments tested. This is in agreement with the clinical observations of Crawford and King,[11] who, however, used much weaker penicillin ointments. The decrease in number of mitotic figures found in the epithelium treated with the sodium-salt ointments, although suggestive, was too slight to be regarded as significant; however, it should be pointed out that this preparation slightly delayed epithelization also.

Although penicillin in ointments did not significantly delay healing in these experiments, the application of penicillin in other forms may cause marked harm to the corneal epithelium. The intact cor-

nea cannot tolerate even minute quantities of penicillin powder applied directly. Owing to the solubility of these powders it seems certain that the damage is not caused mechanically. The effect of such local application of penicillin to healing burns was disastrous, for the epithelium not only failed to heal but some of the unburned portion was sloughed away. Again the effect could not have been due to mechanical action of the particles. Use of penicillin powders in this manner is definitely contraindicated. Anhydrous penicillin powders, however, may be applied if the penicillin is sufficiently diluted, as was shown in the experiments with lactose-penicillin powders. The use of powders has the advantage that the penicillin is almost instantly dissolved and an aqueous film of very concentrated penicillin solution covers the epithelium. This film is held for some time by the lactose particles which are permeated by the penicillin solution, and may act as an infinite number of minute lamellas.

Summary

1. The size of the particles of sulfonamide powders applied to injured corneal epithelium is an important factor in the delay they cause in healing.

2. Powders with particle size < 325 mesh inhibit healing the least. When the particle size is 100-200 mesh, marked inhibition results.

3. Sulfadiazine and sulfathiazole powders inhibit the healing of corneal burns less than does sulfacetimide powder.

4. Sulfadiazine and sulfathiazole powders do not inhibit healing more than presumably inert powders such as ZnO or $CaCO_3$.

5. Finely powdered lactose inhibited healing less than any other powder tested, and hence is suggested as a vehicle or diluent.

6. Ointment bases varied in the degree with which they inhibited the healing of corneal burns. Hydrosorb and lanolin were the least harmful.

7. Application of penicillin ointments (1,500 Ox.U./gm.) did not retard epithelization or mitosis in corneal burns more than the ointment bases alone. This was true of both hydrous and anhydrous ointments, particle suspension and solution types, as well as ointments prepared with the free acid of penicillin or its calcium salt. Very slightly less desirable results were obtained with a Na-penicillin-powder suspension ointment.

8. Solid penicillin (Ca or Na salts) applied in minute amounts markedly harms both normal and burned corneal epithelium, completely preventing the healing of corneal burns.

9. Ca-penicillin powder, suitably diluted with lactose (28,000 Ox.U./gm.), may be applied to corneal burns without inhibiting healing more than would the lactose or petrolatum alone.

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OVERSEAS OPHTHALMOLOGY

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How will the practice of ophthalmology in an overseas theater differ from a civilian practice? While perusing case records collected over a 10-month period in 1944, I found bits of information that might be of interest to those who had not been sent overseas. It seemed worthwhile to report this information and to discuss the problems and trends of ophthalmology as I observed them in New Guinea.

Data for this report were gathered from outpatient and hospital services among general, station, and field hospitals in both combat and rear areas. The patients represented all branches of the armed services but were predominantly members of the Army Air Corps and Army ground forces. Approximately 2,400 individuals registered for the first time in the eye departments of these hospitals during the 10-month period. For convenience of discussion the subject matter was divided into six sections; namely, refractions and ocular-muscle problems; so-called diseases of the external eye; ocular conditions produced by trauma; neurologic and medical problems associated with the eyes; surgical procedures; and equipment and supplies.

REFRACTIONS AND OCULAR-MUSCLE PROBLEMS

The majority of the patients, some 1,450 (60 percent of the total), were registered in the refraction department because of complaints referable to an alteration of visual acuity or because of headaches. The diminution or blurring of vision was associated either with reading, working in the sun, attending movies, syncope, or dizziness. Such symptoms were similar to those met with in civilian practice except for the frequent implication of the tropic sunlight. Each patient was given a complete ocular examination, and some type of refraction was performed.

In only half of the cases was there found a refractive error of such degree as to warrant a prescription for glasses. These individuals presented the familiar symptoms of eye fatigue associated with attending movies or doing close work and usually obtained relief by the wearing of correcting lenses. An exception was encountered among radar operators of air-warning units. These individuals usually worked six-to-eight-hour shifts daily, oftentimes at night. From the description

of their work in addition to the intensity of their ocular symptoms it appeared that this occupation was unusually fatiguing to the eyes. Most of the radar operators had a visual acuity of 20/20 and a refractive error under cycloplegia of less than one diopter in any meridian. Prescribing of glasses did not always bring relief of symptoms. In general, the types of refractive errors among the group to whom glasses were issued were similar to those encountered in civilian practice.

In the 50 percent to whom glasses were not issued, an ocular basis for their complaints was not found. These individuals associated their eye complaints either with dizzy spells, bizarre headaches, or outdoor work in the heat. A history of eye difficulties prior to their service in this area was not often obtained. Many of these soldiers had visited clinics in other hospitals without obtaining relief of their symptoms. In all cases the symptomatology did not seem sufficiently marked nor incapacitating to warrant evacuation from an overseas theater. Their repeated attendance at sick call created quite a problem for the unit medical officer. Most of the patients were dissatisfied that an organic basis for their difficulties was not found.

Many soldiers complained of photosensitivity not associated with dizziness, headache, fainting, or other psychoneuroticlike symptoms. Special attention was given to this complaint because the individual felt incapacitated for outdoor work. With the instruments available, alterations in the corneas and lenses were not seen. Alteration of the pigment content of the maculas was not observed. This symptom seemed equally as frequent in blonds and brunets. Sunglasses of good quality were so scarce that a therapeutic trial was not always possible except in Air Corps personnel. I felt that the efficiency of many ground-force personnel would have been improved if a larger supply of sunglasses had been available. In the absence of definite ocular pathologic change one could only assume that the photosensitivity was, in a sense, a physiologic response of the eyes to tropical sunlight.

Flying personnel of the Air Corps were infrequent visitors to the refracting room, although a large number of such personnel were present in this area during the period of this study. The low incidence of visual-acuity complaints among this group speaks well for the screening methods employed in the United States. When such personnel did report with eye complaints, their refractive error, heterophoria, and accommodative and convergence relationships were found to be within the limits of normal. The flight surgeon usually felt that such individuals were suffering from combat and flying fatigue.

Only a few cases of abnormal heterophoria were encountered. These were managed by prescribing appropriate prisms, as was customary in civilian practice. Soldiers seemed more tolerant of prisms than civilians with similar muscle imbalances.

On an average of twice a month a case of subnormal accommodation with or without convergence weakness was encountered. In all of these, difficulty with close work had occurred since the subject's arrival overseas. None had had any other illness. Repeated examinations always revealed a remote near point of accommodation; the near point often approaching that of a presbyopic individual. I was unable to find an etiology. Plus spherical corrections were added to the refractive error as revealed by cycloplegia, and most of the patients obtained symptomatic relief by wearing the spectacles for near work. In some cases simple convergence exercises were recom-

mended, but the soldiers would not persist in such exercises.

Soldiers with nontraumatic, long existent strabismus were frequent visitors to the eye clinics. Because of limited finances the strabismus had not been corrected in civilian life. The soldiers believed that the strabismus could be easily corrected by the Army "docs" and, in addition, would entail no financial outlay. Early in my overseas service I saw about 10 men with strabismus who had been operated on by Army surgeons. All of these individuals presented excellent cosmetic results, but they were disappointed either because there was no improvement in visual acuity or because of onset of diplopia. The diplopia made them of little use to the Army. Those with diplopia knew that if they made enough fuss about their "double vision" they would be returned to the United States. Those in whom visual acuity had not improved had had poor vision prior to surgery. Subsequently, I became cautious about advising surgical correction for a strabismus that had existed prior to Army service. It seemed that proper preoperative selection of these cases had not been seriously considered. However, there was an occasional need for such surgery among personnel with marked comitant strabismus employed as instructors, and personnel with an alternating strabismus who did skilled work. Such individuals were usually non commissioned officers who occupied responsible positions. The few patients whom I selected for surgery were given careful explanations of the probable functional as well as cosmetic result. When they were returned to duty they not only appreciated the improved cosmetic effects but were also cognizant of the limitations to perfect binocular vision.

Interesting cases of unilateral amblyopia ex anopsia were encountered, in some of which there was also a comitant strabismus of the amblyopic eye. It was noted that these individuals became more aware of their ocular defects after entry into Army service or assignment to overseas duty. They associated an inability to do ordinary tasks, not involving the use of their eyes, with either their defective vision or the strabismus. They gave a history of having consulted several Army oculists and of having had many refractions. A few of them contended they were aware of diplopia, although suppression of the visual image in one eye had existed prior to Army service. In all but one case I was unable to elicit diplopia. These soldiers were apparently attempting to use either the amblyopia or the strabismus as an escape from a disagreeable situation. Most of them were referred to a neuropsychiatrist.

There were no instances of definite or persistent ocular malingering. A few individuals were seen every month who half-heartedly feigned poor visual acuity in a normal-appearing eye. Most of them were Negroes assigned to engineering units. Once these soldiers were shown that their visual acuity was normal they returned to duty satisfied.

A few cases of presbyopia were encountered, but it was possible to handle them without resorting to bifocal lenses.

Diseases of the external eye

Approximately 500 cases (20 percent of the total) comprised this group.

Chronic, nonspecific conjunctivitis; blepharitis; hordeola; and chalazia were the predominant diseases treated in this group. I came to regard these conditions in this locality as phases of the same disease, the conjunctivitis and blepharitis representing the initial stage and the chalazion the end result. They were observed in both male and female personnel, blonds and brunets, individuals in outdoor as well as indoor occupations. Serv-

ice in this theater seemed a contributing factor, since many of them never before had experienced such ocular conditions. Dust was an ever-present nuisance. Cultures and smears of the ocular secretions from these cases revealed no consistent pathologic organisms. The cases of blepharitis caused the most difficulty. With hospitalization, the severest cases subsided in from four to five days. Once the patient returned to duty the blepharitis usually recurred, and the soldier plagued the dispensary medical officer with a seemingly incurable, chronic disease. However, it did not seem that sufficient attention was given at the unit dispensaries to treatment of the early stages of this disease. With a little more attention to local therapy and local hygiene, these cases could be kept in check, making hospitalization unnecessary. From the standpoint of the time spent on sick call and in hospitals, these diseases were an important problem among Army personnel.

Pterygia occurred in about the same frequency as would be seen in a civilian practice located in an agricultural community. However, pterygia among soldiers were larger and progressed more rapidly. The usual surgical methods for correction of the pterygia were not always successful. An average of one soldier per month came to the eye clinic with a recurrence of the pterygium; some had had several operations. The eyes with recurrences appeared to have had some type of transplantation operation, but the apex of the pterygium was reattached to the surface of the cornea. Several of these individuals had been operated on by competent Army oculists so that it was not a question of skill. I did not have an opportunity to observe after a lapse of several months the cases on which I performed a transplantation operation. Other oculists probably observed recurrences in the cases in which I operated. Some degree of corneal opacity occurred following the transplantation or excision of large pterygia. In the Army service it seems wise to operate on the pterygium as early as possible in its growth period.

Burns of the eye were produced by a wide variety of external agents. Refrigerating fluids, ether, acetone, sulphuric acid, battery acid, chemical smokes, ultraviolet rays from the welder's torch, hydraulic-brake fluid, ignited kerosene, and explosions of gasoline were the causes found among the case records. The emergency care of ocular burns by the unit medical officer was excellent in all cases. With the exception of burns resulting from refrigerating fluids, the corneas recovered their transparency, and there was little impairment of visual acuity. In all cases the burns were bilateral. Burns produced by exposure to the welder's torch recovered most rapidly; burns from refrigerating fluids responded least to therapy. A 2-percent solution of sodium bicarbonate was the most frequently used irrigant. This weak, alkaline solution seemed more soothing to the patient than solutions of boric acid, water, or normal saline. A 2-percent solution of butyn, a 0.5-percent solution of pontocaine, and a commercial type of ointment combining 2-percent butyn and 1:3,000 metaphen were used with equal efficacy for relief of pain. Atropine was routinely instilled. In combat zones, topical analgesics were sometimes not available. Burns produced by explosions of gasoline following aircraft accidents were contaminated with dust, dirt, and pieces of cordite. Recovery from such burns was better than I anticipated.

An interesting case of the last-named type came under observation at a field hospital. Seven survivors of an airplane crash were brought to the hospital with burns of much of the body surfaces. Another Army ophthalmologist and I shared

the care of the ocular burns. In the confusion attendant upon the admission of these patients one individual's eyes were overlooked. This patient remained in a semicoma for six days. Eye therapy throughout this interval consisted of boric or normal saline drops routinely instilled by the nurses. On the seventh day the patient was sufficiently aroused to complain bitterly about pain in his eyes. It was then discovered that he had not been seen by an oculist prior to that time. Upon inspection of the eyes two thirds of the surface area of each cornea stained with a solution of fluorescein. The denuded areas did not appear to extend deeper than Bowman's membrane. The margins of the burned areas were not necrotic. The conjunctivas were of normal appearance. The entire external surfaces of the eyes appeared clean and free from secondary infection. The eyes were patched for 24 hours and the corneal surfaces were soon covered with epithelium. Ultimately visual acuity was normal. It seemed that the simple, mechanical washing of the conjunctivas carried out by the nurses forestalled secondary infection and contributed to the satisfactory outcome.

Acute keratoconjunctivitis was a problem in this area. Clinically the cases resembled those described in the United States as "shipyard conjunctivitis." In half of these cases, cultures of the discharge revealed Staphylococcus albus. In the remainder, repeated cultures and smears were negative. The local use of such drugs as sulfadiazine, zinc, argyrol, and mercuric oxide failed to influence the course of the disease. Oral intake of sulfadiazine likewise was of no benefit. Penicillin instilled at frequent intervals into the conjunctival sac seemed to be the most efficacious of all drugs tried. Oftentimes a herpes labialis appeared at some time during the course of the disease. Two cases were associated with a solitary, herpes-like lesion on one eyelid. In both a typical dendritic keratitis developed. I felt that these cases were caused by a virus, although conjunctival scraping stained with the available dyes did not reveal inclusion bodies. The ultimate recovery was good. From a military standpoint, these soldiers were incapable of duty for from four to five weeks.

Several cases a week were referred from the dermatology department with inflamed conjunctivas and dermatitis of the eyelids. In all of them, there was either an eczematoid or exfoliative dermatitis of various body surfaces. I found nothing that would cure the eye condition so long as the dermatitis persisted. The local use of penicillin either as an ointment or in solution was the most efficacious in reducing the congestion of the conjunctivas and eliminating the discharge. The discharge from the conjunctivas seemed particularly irritating to the skin of the eyelids. A thin layer of zinc-oxide paste applied to the eyelids after all crusts and flakes were brushed away proved to be the most beneficial therapy for the surrounding skin. Keratitis was prone to develop if eye irrigations were neglected. Staphylococcus albus, hemolytic and nonhemolytic streptococcus, and gram-negative bacilli were most often cultured from the conjunctivas.

The remaining external eye conditions encountered were of a miscellaneous nature; for example, corneal ulcers, iridocyclitis, scleritis, blepharospasm, corneal opacities, phlyctenular conjunctivitis, dermatitis medicamentosa of the conjunctivas and eyelids, papillomas, dacryocystitis, and melanomas of the conjunctiva. There was nothing among this group of an unusual nature. The corneal ulcers were the result of incomplete removal of superficial foreign bodies. Progressive, serpiginous ulcer did not occur if the foreign body was completely removed at

the initial visit. The cases of iridocyclitis were mild and fewer than I expected. An unusual type of corneal opacity that seemed peculiar to soldiers serving in the tropics was observed. Observations on this peculiar eye condition have been forwarded for publication.

Ocular conditions produced by trauma

In contemplation of such a report as this, all ocular conditions produced by trauma were carefully recorded and classified. There were two reasons for this special attention. First, I assumed that ocular trauma would be very frequent among Army personnel. Secondly, I assumed that the factors responsible for the trauma would be far different from those observed in an industrial or civilian practice. Both of these assumptions I found to be incorrect.

Only 170 cases (8 percent of the total number of patients) of ocular trauma were encountered. Of these only 60 (2.5 percent of the total registration) were produced by combat with the enemy. The remaining cases were produced by the hazards common to everyday living.

The ocular injuries received in combat areas were always severe and usually unilateral. Either traumatic cataract, retained intraocular foreign body, panophthalmitis, prolapsed iris, or intraocular hemorrhage was the end result. Bullets, shrapnel, booby traps, and pieces of coral were the offending agents among combat troops. Injuries to the eye unaccompanied by wounds or lacerations of other body surfaces were incurred while the soldier was peeking over the rim of a foxhole. Oftentimes the missile was small and dropped out of the eye by the time the soldier reached an evacuation hospital. The retained foreign bodies were most often nonmagnetic. The Berman localizer helped us to determine the magnetic properties of the foreign body. The traumatic cataracts were not different from those seen in civilian practice. Iridodialysis was seldom observed. Dislocation of the lens was not seen. Prolapse of the iris was easily corrected in all instances, but these cases were seen shortly after injury. Panophthalmitis developed in about one third of the cases in this group. The incidence of this complication seemed in proportion to the time interval between injury and the first examination by an ophthalmologist. Once panophthalmitis had developed, parenteral, oral, or local use of sulfadiazine and penicillin seemed to have no effect.

In 55 percent of the cases, the factors responsible for the trauma were unavoidable and did not involve contact with the enemy. Detached retinas, contusions of the eye, orbital fractures, and the ophthalmoplegias were incurred in this manner. The cases of detached retinas were seen in Air Corps mechanics who had unwittingly bumped their heads on a protruding part of the airplane. The orbital fractures were usually associated with fractures of the mandible and maxillas. Manipulation of the body and frontal process of the malar bone was the most difficult feature of these orbital fractures. Reduction of the mandibular fracture and occlusion of the teeth were first necessary to secure a foundation on which the other facial bones could be manipulated. I was fortunate in that an oral surgeon was available to carry out these procedures. Ophthalmoplegias were induced by crushing injuries to the head. Function of the external rectus muscle was most frequently impaired; function of the superior oblique was the least apt to be impaired. When more than one ocular muscle was paralyzed, internal ophthalmoplegia was also present. In none of the cases of external ophthalmoplegia did normal muscle function become reëstablished

during an observation period of six weeks.

Five percent of the cases of ocular trauma were attributed to carelessness. Individuals so injured were usually members of a detail engaged in cleaning fire arms, working on rifle ranges, or disposing of refuse. The gun that someone said was unloaded claimed many victims. The unsuspected bullet or powder charge that exploded when a pile of refuse was ignited accounted for three of the four cases of ruptured globes. Hammering on shell casings and melting bullets for their lead content were also frequent sources of ocular injury.

Medical and neurological ophthalmology

Approximately 280 cases (11 percent of the total) composed this group. In this theater there was an opportunity to examine the fundi of individuals suffering from diseases not usually seen in civilian practice; such as, tsutsugamushi fever, malarial fever, and dengue. Although other ophthalmologists told me that retinal hemorrhages were apt to occur during an attack of tsutsugamushi fever, I was unable to detect any alteration in the retina, optic nerve, and choroid in the 45 cases that I had the opportunity to examine. These cases of "scrub typhus" were examined during all phases of the disease. The fundi were also normal in cases of cerebral as well as noncerebral types of malaria. However, in many of the cases of malaria and "scrub typhus" subconjunctival hemorrhages developed or hemorrhages in the fascial investments of the ocular-muscle tendons. There was nothing in the configuration or the location of these hemorrhages that was peculiar to either of these diseases. Neither was I able to determine in which cases hemorrhages in the external coats of the eyeball were likely to occur. Hemorrhages in the subconjunctival tissues were frequent with 'scrub typhus," infrequent with malarial fever. The hemorrhages occurred with sufficient frequency in the former disease to be of diagnostic significance. The triad of subconjunctival hemorrhages, fever, and lymphadenopathy often proved sufficient to make a diagnosis of "scrub typhus" in early cases, even though an eschar was not found. Aside from the intense retro-orbital headaches and dull pain upon ocular rotation, ocular complications during the course of dengue were not observed.

Although most of the routine funduscopic examinations proved to be negative, one or two patients a week would exhibit some pathologic lesion. Several cases of acute vasospastic retinitis were seen initially on the eye service, and the patient was subsequently evacuated because of hypertension. Narrowing and sclerosis of the retinal arterioles compatible with a diagnosis of benign hypertension were occasionally observed. Retinitis of anemia was observed among cases of thrombocytopenic purpura, aplastic anemia, and myelogenous leukemia. Retinitis of diabetes was very infrequent, and no funduscopic changes accompanying either acute glomerular nephritis or meningitis were recorded.

One of the most interesting conditions seen among the group occurred in a flyer who had bailed out over tropic waters. This aviator had floated in the water for three days and three nights before being rescued. According to the patient, his rescuers had commented on the marked swelling of his body tissues. On the medical record accompanying the patient was the observation that massive edema of the subcutaneous tissues of the thorax, neck, thighs, and legs existed. Ophthalmoscopic examination was made for the first time one week following rescue, when much of the body edema had subsided. I

do not recall seeing such extensive edema of the retina as existed in this patient. In the maculas alone there were large circumscribed masses of edema with elevation of the surface of the retina to three diopters. Several branches of the retinal arterioles supplying the macular areas were markedly narrowed, irregular in caliber, and surrounded by dense perivascular sheathing. These changes suggested an ischemic origin of the edema. It was felt that the prolonged immersion contributed to the changes observed in the retina.

About once a month an individual with papilledema was seen. These patients had suffered injury to the skull with either subsequent brain abscess, epidural bleeding, or subdural hematoma. Unequal pupils, nuclear ophthalmoplegias, conjugate deviations, and homonymous defects in the visual field were other ocular findings noted in these cases. In two individuals presenting complaints of headaches, but without previous head injury, bilateral papilledema was found. A provisional diagnosis of brain tumor on the basis of the neurologic and spinal-fluid findings was made.

Visual fields were frequently plotted of individuals complaining of postconcussion headaches. In only one case was a definite defect found in the visual fields. Perimetric studies were also useful to the neuropsychiatrists to corroborate the diagnosis of hysteria.

Ocular surgery

Contrary to my expectations, there was comparatively little ocular surgery to perform. The cases requiring surgery constituted only 2.5 percent of the entire ophthalmologic practice. While working in a general hospital I observed patients on whom ocular surgery had been performed in more forward areas. These represented another 2 percent of the patients. In both field and station hospitals, there was an opportunity to do more ocular surgery than in a general hospital.

In the field and station hospitals, the surgery was more of an emergency type. Ruptured globes, eyes requiring early enucleation or evisceration, the excision of a prolapsed iris, the management of a corneal laceration, and the repair of lid-margin defects were the problems usually encountered. In general and station hospitals in rear areas, traumatic cataracts, paralytic squints, iris synechiae, ptosis, detachment of the retina, manipulation of fractures about the bony margins of the orbit, and intraocular foreign bodies predominated. Pterygium surgery was common in hospitals of both forward and rear areas.

Much of the surgery performed in this area was done in open buildings. I worked in both open and closed buildings and, except for the factor of dust, it seemed to make little difference whether the operating rooms were closed or open. The incidence of postoperative infections was practically nil so long as the atmosphere was relatively free of dust. In a hospital located adjacent to a dusty, well-traveled highway, I observed that the postoperative course of my patients was not so smooth as in hospitals where the wards and operating room were farther removed from the roads. The eyes of patients who had been evacuated to this hospital from forward areas and who had had evisceration, lid-margin repairs, or removal of an intraocular foreign body were often infected and their postoperative course was prolonged. These cases had little care enroute, and I believe that was the factor responsible for sloughing of sutures and tissue necrosis.

Except for peterygium surgery, the surgical techniques commonly employed in civilian life were applicable for ocular surgery in war zones. As mentioned in a previous paragraph, the pterygia among soldiers were prone to recur after the

usual transplantation operation. Plastic procedures on the conjunctiva with excision of the growth were necessary more often than in civilian practice. To forestall the recurrence of the pterygium and yet utilize the transplantation technique, I sutured the apex of the growth to the episcleral tissue as well as the overlying conjunctiva at the site of transplantation.

Because most soldiers were evacuated before six months had elapsed from time of injury, plastic procedures for cicatricial entropion and cicatricial ectropion were not carried out. The factor of time also limited the correction of traumatic ptosis. I felt that the ultimate cosmetic result of lid-margin defects was better if surgery was performed early rather than after scar tissue had formed. An occasion for glaucoma surgery did not arise.

The autoclaves and solutions for sterilizing eye instruments were adequate at all hospitals.

Equipment and Supplies

In a report such as this it seemed appropriate to discuss the instruments and supplies available to the overseas ophthalmologist. The equipment list for station and field hospitals included an assortment of forceps, hooks, probes, spatulas, keratomes, knives, knife needles, repositors, spoons, speculums, and scissors adequate for all types of ocular surgery. The ocular surgeon in an overseas general hospital was more limited in the scope of his surgery by a similar supply of instruments. Because of the long distances involved in evacuation to the United States and the relative limitation of space on hospital transports, patients often remained in general hospitals for an extended period of time. An opportunity to perform more definitive ocular surgery was thus possible except that some instruments common to the general hospitals in the United States were not provided. The surgical instruments available were of standard design and of good quality.

The unavailability or shortage of replacements made it important to preserve those instruments which were received. In general, the ophthalmic equipment arrived in good condition. In field hospitals ocular surgery was often performed in conjunction with other emergency surgery. This necessitated the sterilization and mixing of the eye instruments with the larger tools of the general and orthopedic surgeons. Blunting or dulling of the instruments was the inevitable result. In the station and general hospitals this factor of handling was not such a problem. The prevalence of rust in the humid climate of the tropics and the realization that the same scissors and knives would have to be used over a period of several years put a premium on the instruments available to us.

The need for a magnet frequently arose not only in ocular surgery but for removal of particles in other tissues of the body. The magnet I received had been donated by a civilian practitioner. This particular instrument was unsatisfactory for the removal of tiny particles within the eye. Nonmagnetic instruments for use with the magnet were not included with the eye equipment.

An electrocautery with several types of points was received. The dermatologist and general surgeon found this instrument very useful for removal of cutaneous warts and tumors. So far as the eye was concerned some type of fulguration apparatus would have been more useful.

The equipment for refractions was complete except for cross cylinders. Where a large number of refractions are done the cross cylinder adds a great deal to the speed with which the patients can be handled, and for that reason it would be a valuable supplement to the diagnostic case. An additional trial frame would be appreciated, for there are so

many screws and joints to get into disrepair. There was some trouble with mold growth on the trial lenses along the coastal areas of New Guinea. If the trial case was placed in a box equipped with an electric lamp this nuisance was eliminated. The electric retinoscope was satisfactory. Heterophoria was determined with the trial frame, red glass, and Maddox rod. A phorometer was not provided.

Spectacles were obtained from strategically located optical centers. The average elapsed time between requisition and delivery was two weeks. Breakage in transit was negligible. A large variety of lens prescriptions was available for dispensing.

One of the most valuable items was the case for the fitting and repair of spectacles. Lost temple screws, bent frames, and loose nose pads brought many soldiers daily to the clinic. The tools, screws, and extra temple pieces made it possible to salvage the spectacles on the spot.

The ophthalmoscope heads projected a beam of light that was wide in diameter and was not of a make commonly used by the civilian practitioner. Anyone coming overseas should bring his own ophthalmoscope.

I came to regard the slitlamp and perimeter as valuable adjuncts to the overseas practice of ophthalmology. There were many occasions to use the slitlamp, had it been available. A perimeter was not included in the original equipment, but one was obtained from a base supply depot. Other ophthalmologists were not so fortunate.

For several months the hospitals were furnished a small supply of glass eyes. More recently they were collected and redistributed to certain key hospitals in the theater. The fitting and wearing of a prothesis among patients awaiting evacuation was a big morale booster. The soldier who suffered an enucleation or evisceration was less self-conscious when he was given a prothesis before departure.

The hospitals in this area were first established in what was considered a combat zone. The field hospitals and most of the station hospitals were set up beneath canvas. Prefabricated buildings were provided for the general hospitals. Once the buildings and tents were erected, improvisation was necessary to complete the furnishings of the eye clinics.

A dark room was one of the chief needs. For field hospitals and some station hospitals a portable room seemed the most practicable. Pieces of press wood were obtained through local channels and nailed to wooden frames. A room of approximately 6 by 6 by 8 feet seemed adequate. For the general hospital, a dark room 20 ft. in length with sufficient space for a perimeter, slitlamp, and transilluminator was constructed. In the climate of New Guinea, ventilation in these rooms was important. Shielded inlet and outlet air vents were necessary. Still these rooms were too hot for prolonged occupancy. An electric fan easily solved the problem of ventilation, but fans were not a part of the initial equipment and had to be obtained by special requisition.

All of the diagnostic instruments were 110 volts, but the standard current from the generator was actually 240 volts. There were sufficient transformers available to handle the difference in voltage.

Rheostats were provided, and the electric bulbs for most of the diagnostic instruments were used over a long period of time before they burned out. However, the bulbs provided for the transilluminator were not of sufficient voltage adequately to carry the illumination necessary with this instrument. The transilluminator soon became useless for want of bulb replacements.

A wood or cement floor seemed desirable for eye clinics. With hard dirt or gravel floors it was not possible to keep

the eyes and instruments as free of dust as one would desire.

In general, the supply of drugs for use in the eyes was adequate except in the forward areas. In such areas there was a scarcity of topical analgesics such as butyn and pontacaine. Homatropine was another drug not easily obtained. Cocaine was available, but one hesitated to use the drug for expediting the removal of foreign bodies in the cornea. Atropine, the old standby, was always available. An item that found universal use among hospitals, unit dispensaries, and aid stations was a common commercial ointment combining butyn and metaphen. I saw few undesirable reactions in eyes to which this compound was applied. It provided a good deal of comfort to the patient during his transit to an ophthalmologist. It was a useful item for emergency eye therapy. There was little occasion for the use of physostigmine.

Intravenous typhoid vaccine was a very useful agent in the treatment of stubborn cases of conjunctivitis, keratitis, iritis, and intraocular conditions of either endogenous or exogenous origin. Eyes responded to Army typhoid vaccine where all other therapeutic measures failed. However, there was one difficulty. Every bottle of typhoid vaccine I received was long antedated, frequently over six months. I soon discovered that the potency of the vaccine was proportionate to its age. An initial dose of from one to five million organisms was usually adequate. In higher initial concentrations the fever was prone to go above 102°F., a 12- to 18-hour period of fever was apt to occur, secondary and tertiary reactions would appear, and the patient experienced severe chills. Even with such severe reactions I did not see any kidney or liver complications. I feel that Army typhoid vaccine is a safe agent for intravenous use so long as its increased potency is kept in mind.

Discussion and Summary

The patients from which the data for this report were gathered were a good composite of combat and noncombat personnel. The total number of soldiers examined would probably approximate the average observed in other hospitals in this area over a like period of time. It was not the purpose of this report to formulate definite conclusions but only to comment on the trends of an ophthalmologic practice among such a group of soldiers.

I was not prepared before coming to this area to find that such a large proportion of an overseas practice would be devoted to refractions. Rather I had assumed that my time would be more occupied with the treating of external eye diseases and repairing the effects of trauma. Many of the individuals examined in the refraction room probably would not have consulted an oculist in civilian practice because their eye complaints were so frequently linked up with other bodily complaints peculiar to service in the Army.

Unilateral amblyopia ex anopsia among overseas personnel was more of a problem than among civilians similarly affected. Many of the soldiers had been told they would not be sent overseas. Others cited various reasons why they could not get along overseas so long as they possessed the amblyopia. I felt that unilateral amblyopia ex anopsia was compatible with overseas service so long as the soldier was assigned to tasks in a noncombat area not requiring extensive use of the eyes. Hysterical amblyopia seemed more common among noncombat personnel than in combat troops.

Among the external eye diseases chronic, nonspecific conjunctivitis and blepharitis accounted for the most patients. These diseases were more of a nuisance than a therapeutic problem, and blepharitis, in particular, was responsible

for many soldier hours lost on sick call. Acute keratoconjunctivitis was a problem from the standpoint of prolonged hospitalization and the failure of any local therapy materially to shorten the course of the disease. The etiology of this condition was not satisfactorily determined. Atypical lichen planus and other dermatoses were frequent among soldiers in this area, and secondary involvement of the conjunctiva was not uncommon. Local penicillin therapy was tried for some of the external eye conditions. As a therapeautic agent for local use in the eyes it seemed more efficacious than many of the standard drugs employed in civilian practice, but it was not used in a sufficient number of cases to allow formulation of definite conclusions. Burns of the eyes among soldiers were probably as frequent as burns among civilian personnel working in industrial areas. Prompt treatment was usually possible, and the outcome was uniformly good, except in those eyes that had been burned by refrigerating solutions.

From the limited scope of this survey it seemed that traumatic conditions of the eyes did not comprise a great deal of the overseas ophthalmologic service. Eye injuries as the result of combat, in particular, seemed relatively infrequent. Perhaps the helmet worn by our troops in this war was a factor that influenced the low incidence of eye injuries. The eye injuries among noncombat personnel were produced in a manner not unlike those observed in civilian life.

Medical and neurologic ophthalmology composed but a fraction of the professional work performed by overseas hospital groups. However, when the infrequent need for such examinations did occur, the oculist usually assisted in the differential diagnosis. The neurologist, neurosurgeon, neuropsychiatrist, and internist regarded the ophthalmologist as a handy man to have around when puzzling cases occurred. In this theater approximately 11 percent of the eye patients were examined from the standpoint of these specialties. The opportunity to examine the eyes of patients suffering from diseases endemic to this theater was of particular interest to me. Objective changes in the eyes did not seem to occur with dengue fever; in malaria they were not frequent. Hemorrhages in the subconjunctival tissues of the cases of "scrub typhus" occurred frequently enough to be of diagnostic significance. Although the pathology of "scrub typhus" is vascular in nature, alterations of the choroidal and retinal vessels did not occur in the cases I examined.

Ocular surgery comprised but a small portion of the eye practice. In view of the hazards of warfare I anticipated that surgical cases would be more plentiful. The types of surgery performed in overseas units seemed to vary according to the distance between the hospital and the combat zone.

In general, the equipment furnished the overseas ophthalmologist was adequate and of good quality. Some improvising was necessary in the construction and furnishing of the eye clinics. The occasional shortage of ophthalmic drugs in forward areas seemed not a matter of supply so much as one of distribution.

From a professional standpoint I found my overseas experience an interesting one. There was a good variety of ocular conditions to observe and treat, and the patients were appreciative of their care.

THE REMOVAL OF ADJACENT NEVI OF THE EYELIDS*

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The various and ingenious procedures for the repair of deformities of the lids after surgical removal of tumors have always been fascinating. Many of these depend upon the opposing lid for tissues to supply the loss. In the following case report the tumors were adjacent on opposing surfaces of the right lids, and the problem was solved by utilizing a combination of procedures.

A man, aged 21 years, stated that while an infant it was noted that he had a small brown spot on the lower right lid. This spot was located just below the lashes and at about the junction of the middle with

Fig. 1 (Callahan). Adjacent nevi of the lids. The upper measures 15 mm. by 6 mm.; the lower, 12 mm. by 6 mm.

the lateral third of the lid. This area of pigmentation was not elevated and did not begin to increase in size until about seven years ago. The rate of growth was very slow, and two years ago it extended to the upper lid. When first examined in February, 1945, the nevus of the upper lid was larger (15 mm. by 6 mm.) than that of the lower (12 mm. by 6 mm., fig. 1). Only at the lid margins did the nevi extend through the entire thickness of the lid, and neither tarsus was involved (fig. 2). A general physical examination revealed no other such nevi, but on the

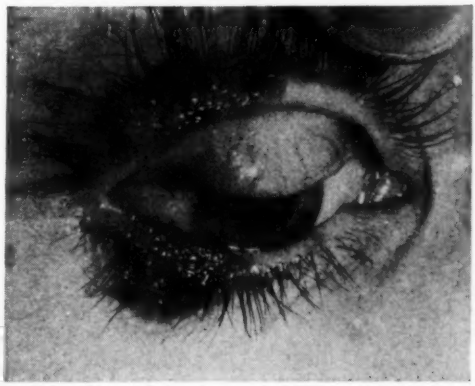
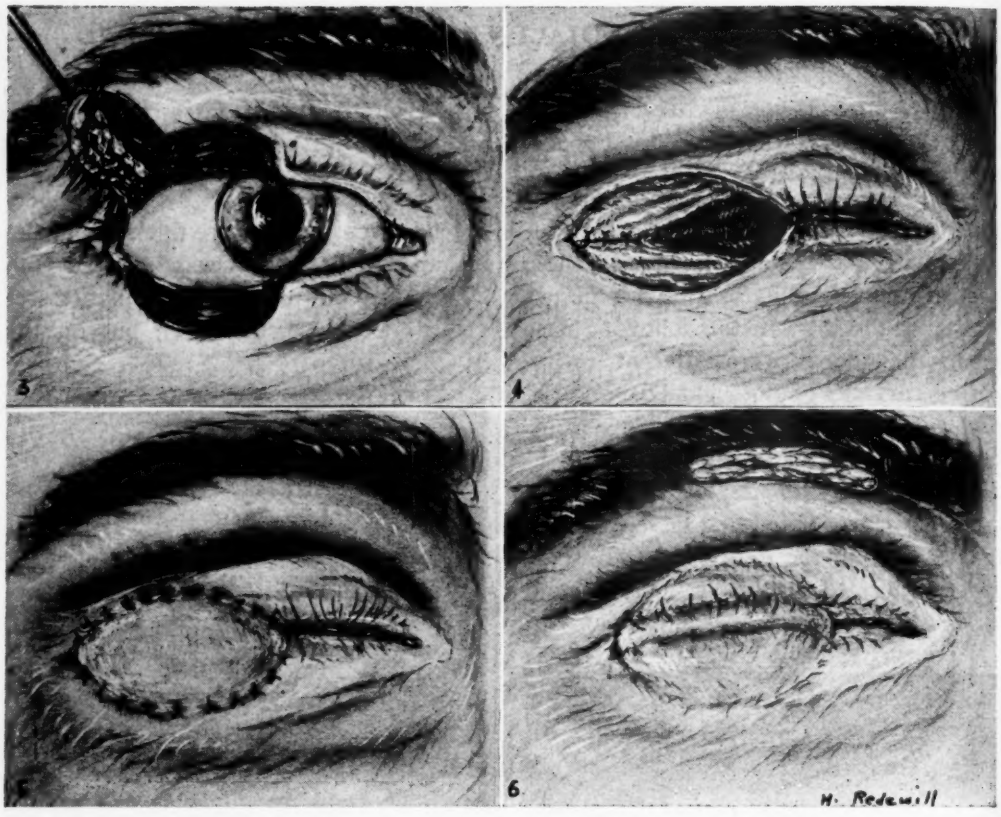


Fig. 2 (Callahan). Adjacent nevi of the lids, with upper lid everted, showing involvement of the margins.

shoulders and upper back there were found many small spots of brown pigment. No melanin was found in the urine.

The first-stage operation was performed on March 12, 1945. Avertin was used as a basal anesthetic, supplemented by novocaine block of the supraorbital and infraorbital nerves. Diathermy cutting current was used to remove the nevi with 3 to 4 mm. of normal tissue surrounding them. The lower nevus was removed first (fig. 3). Dural hooks were used to hold the tumors, and the use of grasping forceps was avoided. The coagulated skin edges and the coagulated mucous-membrane edges were then removed with a scalpel. In the region of the nevi both lids were divided into a posterior lamina of tarsus with mucous

*Presented as a motion-picture to the Louisiana-Mississippi Ophthalmological and Otolaryngological Society, April 27, 1946, at New Orleans.



Figs. 3, 4, 5, 6 (Callahan). Steps in the operation for removal of nevi. Fig. 3, The tumors are held with small hooks, the use of grasping forceps being avoided. Diathermy cutting current is employed to divide the nevi from the lids. Fig. 4, The posterior laminas of conjunctivas and tarsi are joined with chromic catgut 4-0 interrupted sutures. The muscle and subcutaneous tissues are partly joined with the same suture material. Fig. 5, Free skin graft, removed from left upper lid, is sutured into place with silk 4-0 interrupted sutures. Fig. 6, Hair-bearing skin graft placed in center of free skin graft. This operation was performed three months following that shown in figure 5.

membrane, and an anterior lamina of skin, subcutaneous tissue, and muscle. The posterior laminas were joined with chromic catgut sutures and the subcutaneous tissues and muscles were then joined similarly (fig. 4). The skin defect was supplied by a free skin graft from the left upper eyelid (fig. 5). To prevent undue tension on the medial extremity of the graft, a Wheeler lid adhesion was placed half the distance between the graft and the nasal end of the lids. To prevent the bed for the graft from shrinking, one tension suture was placed from the upper lid into the supraorbital tissue and another from the lower lid to the cheek.

Microscopic examination of the tumors revealed clusters of nevus cells and considerable melanin pigment beneath an atrophic epithelium. There was no evidence of malignancy, and the diagnosis was made of benign moles.

The graft grew excellently, and almost the normal degree of elasticity of skin and subcutaneous tissues returned.

On May 28, 1945, the second-stage operation was performed. An incision was made through the skin into the subcu-

taneous tissues across the center of the previously transferred skin graft. The skin edges were slightly undermined. An area of hair-bearing skin, the width including four rows of cilia and the length approximately that of the previous skin graft, was removed from the right eyebrow. This was not rotated, but kept in the same relative position and sutured into the incision created for it (fig. 6). No cilia were planned for the margin of the lower lid, since they are not prominent.

This area of hair-bearing skin grew excellently, but, as is often the case, the cilia present in the graft fell out, a few at a time, with loss of all in about 10 days. In three weeks, however, the hair follicles of the center rows had begun to grow new cilia, and by the latter part of July there was an excellent line of them. On August 3, 1945, the lids were divided just below the cilia.

On August 20, 1945, the patient was discharged with relatively normal lids and a slightly irregular but not conspicuously abnormal lash-line of the upper right lid. The new cilia turn upward, forward, and have an inclination laterally (fig. 7).

Comment. The satisfactory result obtained in this case (compare figures 1 and 7) encourages the early removal of nevi which show a tendency to growth after a long period of quiescence.

Fig. 7 (Callahan). Final appearance after division of lids, performed two months after transplant of hair-bearing skin.

In this case the pathologic report revealed no malignancy; but, in a spreading nevus, a protracted delay would have meant further unsightly involvement of both lids with the necessity of more extensive surgical procedures when finally removed. There is always the possibility, of course, that malignant changes may set in.

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THE RELATIONSHIP OF RUBELLA IN THE MOTHER TO CONGENITAL CATARACTS IN THE CHILD*

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In 1942, Dr. N. McAlester Gregg,[1] an Australian physician, called attention to the occurrence of congenital cataracts in infants whose mothers had had German measles in the early months of pregnancy. In 1943, a nationwide investigation was conducted by the National Health and Medical Research Council of Australia.[2] Dr. Algernon B. Reese[3] reviewed the reports of the Australian physicians in 1944 and added three cases of his own.

In Gregg's report, which consisted of 78 cases, 20 of which he had examined personally and the records of the remainder of which he had studied, most of the babies were undernourished and presented feeding problems; all had cataracts from birth, 62 of them bilateral; most of them had heart lesions; all had poorly developed musculature, and the majority had subnormal mentality.

We wish to report six cases seen from the Houston area between July, 1943, and December, 1944. Five of these were bilateral, one unilateral. An additional case is reported which has all the earmarks of the syndrome, but which lacks a history of rubella in the mother.

CASE REPORTS

Case 1. Barbara M. was born at full term and of normal weight. The mother had contracted rubella during the first month of pregnancy. The cataracts had been noted at birth. We saw her when she was seven months old.

The eyeballs were much smaller than normal, the pupils were completely opaque; there was a coarse lateral nystagmus and alternating convergent strabismus. She had a congenital heart lesion and defective hearing. The pupils were equal and reacted promptly to light. They dilated regularly and well with homatropine and paredrine, showing a clear ring of tissue around the opaque center. The right lens was needled by Ziegler's method when the child was 11 months of age and the left one a few weeks later. There remains a membrane across each pupil and there is a high degree of alternating convergent strabismus and severe nystagmus. The mother writes that the baby's vision is improving, that she picks up small objects and notes colors.

Case 2. Stephanie S., aged three weeks, was examined on December 6, 1943. The child was born at full term and weighed seven pounds. The mother had had German measles during the second month of pregnancy. Both eyeballs were microphthalmic; the lenses in the pupillary area were completely opaque. The pupils dilated equally and well, showing an opaque center with some clear lens substance in the periphery. The opacity seemed to come farther forward in the left eye. This was a "blue baby," probably from absence of the interventricular septum. It was thought best to give the baby time to gather strength before operating. On September 21st a needling was performed on the right eye. This left a thin membrane, which was incised on November 6, 1944, at the same time that the lens of the left eye was needled. The tiny opaque nucleus came into the anterior chamber and took several weeks to become ab-

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sorbed. The child now has clear pupils, with alternating convergent strabismus.

Case 3. George F. was seen on December 20, 1943, when he was three months old. He was born at seven months, was a twin, the other baby having been stillborn. He weighed 3½ pounds. The mother had had German measles in the first month of pregnancy. The child was poorly developed and had a congenital heart lesion. At 19 months he weighed 18½ pounds, did not crawl nor stand alone, and threw his head backward in a manner characteristic of these infants. The pupil of the left eye was opaque at birth, that of the right not completely so, but at the examination both seemed the same. There was a fine lateral nystagmus. The eyeballs were considerably smaller than normal. The pupils dilated fairly well. There were no posterior synechiae. A small ring of clear cortex surrounded the opaque centers. On July 24, 1944, the lens of the left eye was needled. The lens material was not absorbed well, and a rather thick membrane remained which became vascularized from large vessels in the iris. The lens of the right eye was needled on September 7th and the nucleus was broken up with the knife. The membrane and iris of the left eye were incised at the same operation. The baby now has a clear black pupil in the right eye, and an elongated slit in the left.

Case 4. Carolyn M. was brought for consultation March 21, 1944, when she was three months old. She was a full-term baby and weighed 4 lbs., 6 oz. at birth. She was the fourth child, the other children all having normal eyes. The mother had had rubella early in the third month of pregnancy. The baby had a congenital heart lesion and poorly developed musculature. Both eyes were very small, and the pupils were completely obstructed by opaque lenses. There was a coarse lateral nystagmus. The pupils dilated poorly but there was no synechiae. A small rim of clear lens material surrounded the opacities. On October 21st the lens of the right eye was needled and the nucleus broken up with the knife. On December 13th the same operation was performed on the left eye. The baby now has clear black pupils, but in the left eye the iris is adherent to the puncture wound. At 16 months the child can sit alone but cannot stand nor walk. She seems apathetic and doubtless has subnormal mentality.

Case 5. Judith M. was brought for consultation on May 15, 1944, at five months of age. She was an 8-months baby and weighed 5 pounds at birth. She had gained 6 pounds since birth and looked well nourished. She was the second child, the first being normal. The mother had German measles in the first month of pregnancy. The child had a congenital heart lesion and became somewhat blue on exertion. There was a slight lateral nystagmus. The eyes were somewhat smaller than normal. The pupillary area of the right eye was completely covered by the lens opacity; that of the left was less dense. There was a rim of clear lens material in each periphery. The pupils did not dilate well with any mydriatic. Needling was performed on the right eye on September 8th. The lens substance was absorbed slowly, leaving a white spot in the center of a thin membrane. On November 21st the membrane was incised and at the same operation the lens of the left eye was needled and the nucleus macerated. The lens material in the left eye was absorbed poorly, so it was attacked again on January 5, 1945. By January 25th there was a clear central opening surrounded by unabsorbed lens substance. At 17 months the child does not sit nor

stand alone. It has intermittent convergent strabismus and a fine lateral nystagmus.

Case 6. Sammie L., aged nine months, was examined on September 11, 1944. There was a cataract in the left eye completely covering the pupillary area. With the pupil dilated it was found that only the central area was involved, with a clear ring about it. The eye was definitely smaller than the other. There was no nystagmus. The lens of the right eye was clear. The mother had had German measles early in the second month of pregnancy. The child was born at term and weighed 5¼ pounds. He was a difficult feeding problem and had a behavior pattern similar to that of the babies with bilateral cataracts—such as dropping his head backward and pressing on the eye with the hands. We did not operate upon this child.

Case 7. John W. P., Jr., was brought to us for consultation on December 12, 1944, when he was one year old. He was undernourished, poorly developed, and had a congenital heart lesion. The eyes were about normal in size; both pupillary areas were obstructed by opaque lenses. The pupils dilated poorly but some clear lens materials surrounded the central areas. Both ears were discharging. The mother denied having had any illness during pregnancy that could be called German measles. The baby was referred to the University of Texas Clinic for operation.

Summary

In reporting these cases we are presenting nothing new, but there has been very little published about it in the American literature and it seems that the appearance of six cases of congenital cataracts in infants whose mothers had rubella during pregnancy, in one office, within a year, makes it a serious enough problem to merit more discussion. Throughout the Gulf Coast area of Texas an epidemic of German measles occurred in 1942 and 1943. The cause of this disease is unknown but it is quite infectious. Affected persons were not very sick with it and in some cases it was probably so mild as to make little impression. That is possibly what happened in case 7. The epidemic was characterized by pharyngitis, cervical adenopathy, mild fever, and a papular rash which began on the face and spread downward.

There are several peculiar features about this syndrome that in the light of our present knowledge defy explanation. The deformities following German measles in the mother are too much a part of the picture to pass it off as a coincidence. It is true that we have never thought to question the mothers of children with congenital cataracts concerning this kind of infection until it was called to our attention. It seems likely that through the placenta some toxin reaches the embryo that is specific in arresting the development of certain organs, particularly the eyes, the heart, the auditory apparatus, and perhaps the central nervous system. The Australian investigators found that if the mother contracted German measles within the first two months of pregnancy the chances of the child being affected were 100 percent; whereas if the infection appeared in the third month they were 50 percent. Presumably from there on the percentage drops rapidly. This of course brings up the question of the justification for therapeutic abortion when the postulates for 100-percent affection of the child have been fulfilled. Personally we believe that it is better that these miserable little creatures be not brought to birth. Convalescent serum has been used on mothers, but so far as we know no reliable statistics as to its efficacy are available.

These cataracts differ from other congenital cataracts that we have seen. They are usually in microphthalmic eyes, which in itself is bad. The embryonic nucleus is usually alone involved, and may have become so tough and hard that it is difficult to fractionate. In this event absorption is slow. Because of the poorly developed muscles of the iris it is difficult to dilate the pupils with any mydriatic and to keep them dilated after operation. Fortunately, these do not have the characteristics of congenital cataracts caused by intrauterine inflammation as denoted by firm posterior synechiae. We have never seen an eye of this kind successfully operated upon, for each operation is invariably followed by inflammation and fibrosis.

All of our patients were operated upon under ether anesthesia, and no difficulty was encountered. This is contrary to Lawrence Post's experience. He advocates local anesthesia. We encountered no trouble with secondary glaucoma after operation. This may be due to the fact that the lenses were so small that the material turned loose by the knife was not sufficient to swell and close the angle, or for the debris to clog it. As the eye also is small, often commensurate with the size of the lens, another factor may explain it. This is the type of discission in which the posterior capsule as well as the anterior is cut, as advocated by Ziegler years ago. We have had no secondary glaucoma in congenital cataracts since adopting this method.

It is probably wiser to operate upon these infants very soon after birth instead of waiting the 10 or 12 months usually advocated for congenital cataracts. This might prevent the searching movements these eyes develop and when this starts it never disappears. We did not operate as early as this on our patients because of their poor physical condition, but we have decided that the risk should be taken in the future. Glasses should be put on these babies as soon as clear pupils are obtained.

Conclusions

Seven cases of congenital cataracts are recorded, all of them accompanied by other defects, usually congenital heart lesions, poorly developed musculature, and retarded mentality. Six of these were bilateral, one unilateral. Six of the seven mothers had had German measles in the early months of pregnancy. One mother whose baby had the syndrome gave no such history.

The cataracts are typical in that the embryonic nucleus, which develops soon after the fibers are laid down, is affected.

Five of the patients had both eyes operated upon under ether anesthesia. The through-and-through discission advocated by Ziegler was done. Fair results were obtained in all cases. Secondary glaucoma did not occur.

It is doubtless wiser to operate upon these infants within the first two or three months of life, before nystagmus begins.

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HYSTERICAL AMBLYOPIA

Its differentiation from malingering

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In the Army, Separation Centers have been set up for the final complete physical tests for soldiers about to be discharged or "separated" from the Service. These soldiers are received from various Army hospitals or stations throughout the country and are, for the most part, selected because of physical or mental disabilities of sufficient degree so that no suitable assignment is available for them in Service. The men are sent to the Separation Center nearest their homes; the last station from which they return to civilian life. At the time of the final physical examination definite diagnoses must be made together with a ruling as to whether the condition is or is not in line of duty or aggravated by military service. Records from previous stations or hospitals aid in the final diagnosis and evaluation.

In the Ophthalmology Department of the Separation Center at Fort Snelling, Minnesota, a number of interesting and unusual cases of poor vision were encountered, all of similar pattern. The first of these was not immediately recognized and resulted in an incorrect diagnosis of ocular malingering. From the records that accompanied these individuals it could be deduced that previous examiners also had been uncertain of the condition present, and were in doubt about the diagnoses.

Method of approach

The soldier usually had an uncorrected vision of 20/200 or 20/100 in each eye which lenses did not improve to any appreciable extent. A pinhole in the trial frame placed first before one eye and then before the other gave the same results; namely, vision about 20/100. Flashlight observation of the lids, conjunctiva, cornea, and pupillary reaction was negative, and ophthalmoscopic examination of lens, vitreous, and fundus also showed no abnormalities. Of those with previous clinical records the examination also had proved to be negative except for poor vision. The records of some of the individuals showed consultation with the psychiatry department for evaluation, and malingering, hysteria, and neurasthenia were considered.

The majority of these soldiers were being discharged with poor vision, although previously upon entering the service they had passed the visual requirements. In all but three cases the vision originally had been adequate for general service, and although the ocular standards for general service have been changed from time to time since January, 1942, corrected vision of at least 20/40 in each eye had been the minimum requirement during most of this period.

After determining the distance vision with either lenses or pinhole spectacles or both, the visual acuity for close work was next determined by use of the Jaeger chart. In this test the results ranged from ability to read Jaeger 1 with ease, to difficulty with reading type one inch in height. The possibility of malingering was again suggested by these results, and this point will be enlarged upon later.

A visual field was then plotted on a tangent screen. In all these cases a markedly restricted field was found, varying between 1 and 25 degrees, with little or no increase in the size of the field as the patient was seated two or three times farther back than the original distance.

This, of course, is the so called "tubular field" characteristic of hysteria. These cases were also seen by the psychiatrists* at the Separation Center who helped in the clinical diagnoses.

After the desired data such as history, distance and close vision, ophthalmoscopic examination, and visual fields had been noted, the subject was taken aside, and in privacy the following line of suggestion was applied. A sympathetic and paternal attitude was assumed. It was explained that his present vision was poor, to which the soldier would usually agree in a sad tone of voice. However, because of this finding and since no immediate cause could be found for this decrease in vision by the present limited examination, it might be necessary to hospitalize him if a recheck did not show any change. The next step was that he should "rest his eyes" for 10 or 15 minutes. This "resting" was done in the dark room. After this, and still in a helpful and encouraging manner, all the tests were repeated, the results of which are reported later.

Case reports

Incidence. A total of 15 cases of hysterical amblyopia was seen during the examination of the first 1,700 cases at the Separation Center. Only 86 percent (1,462 soldiers) were discharged because of physical or mental defects, the remainder being separated for other reasons such as dependency, essential to the public health, and the like. The frequency should be calculated from the group with these defects, with a resulting incidence of just over 1 percent. However, these are not a random group of servicemen but rather are selected cases recommended for discharge because of specific reasons. Thus one cannot learn from this report what the frequency is of amblyopia due to hysteria among servicemen in general except to say that it is not rare.

Age. Two thirds of the soldiers were in their twenties, with lower and upper limits of 20 and 39 years of age. The average service man was 27 years old, and the mean age 25.5 years. Since the general group of men in service are between 18 and 45 years old with a predominance of those less than 30, the average and mean ages found in this series correspond with the average age of service men. It cannot be said that hysterical amblyopia is predominantly seen in younger men.

Branch of service. There was no one branch of service to which a predominance of the cases belonged. Five were assigned to the Infantry, two each to the Signal Corps and Medical Department, one each to Ordnance, Combat Engineers, Cavalry, Coast Artillery, and Detachment of Enlisted Men's Lists; one was unassigned. That five cases were from the Infantry was to be expected, since this branch of the Army is by far the largest.

Length of service. In general, the men had been in service between one and three years, with extremes of 10 weeks and four years. Some had served well, and of the four who had been overseas two had been in combat under intense fire. However, during the last 6 to 12 months of their service the records had shown repeated treatments by the medical branch either in clinics or hospitals, with gradually diminishing value to the Service.

Vision. The optimum corrected vision on the initial examination was 20/200 or 20/100 in two thirds of the cases (table 1). This vision was obtained by glasses or pinhole spectacles, whichever gave the better results. It was both interesting and

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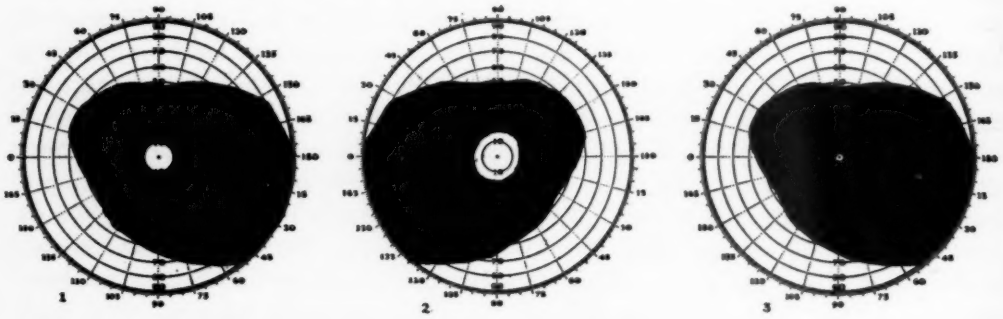
* Marvin Sukov, Comdr. (MC), U.S.N. and John Miller, Capt. (MC), A.U.S. of the Psychiatry Department were most helpful in evaluating these cases and providing suggestions in the work-up.

characteristic that these men would read about 20/100 to 20/200, usually O.U., and not 20/400 or 20/800 or 20/50. Typically the soldier wearing his correction and using binocular vision would say, "I can only see the big letter" (20/200), or possibly read the next line (20/100), with great effort and long pauses between letters. Urging on the part of of examiner to have another line read would be quent blinking, "resting of the eyes" by closing them for a few minutes, rubbing of the lids, and a pained expression were characteristic of the individuals. It would often take 10 or 15 minutes for the soldier to read from the 20/200 line to the lowest possible, with occasional rests during the test. Therefore, in the later cases reading was begun on the 20/40 line with progression to the smaller type.



Figs. 1, 2, 3 (Yasuna). Visual fields in cases of hysterical amblyopia.

Fig. 1, case 3. Soldier 33 years old, 38 months in service; overseas 27 months. Claims "weak eyes" since 1930, becoming worse in service. Vision: O.D. 20/100; O.S. 20/200, with 10-degree tubular fields regardless of size of test object (4 mm. at 1 M. and 3 M.; same size field with 4" object). Jaeger 1 read with ease. After suggestion, vision was 20/30 in each eye but the fields remained unchanged.

Fig. 2, Case 9. Soldier aged 31 years, 49 months in service; 32 months overseas. Claims "weak eyes" after shell explosion on Anzio Beachhead in November, 1943. Vision: O.D. 20/100; O.S. 20/70, with 15-degree tubular fields (4 mm. white test object with no change at 1 and 3 M.). After suggestion, vision was: O.D. 20/40; O.S. 20/30—; fields unchanged.

Fig. 3, Case 10. Soldier aged 37 years, 10 months in service; not overseas. Claims a poor right eye since childhood. Vision: O.D. 20/70; O.S. 20/20. Right field 2 degrees, left field 4 degrees (4 mm. test object at 1 and 3 M.; same size field with large sheet of paper). After suggestion, vision was O.D. 20/30; O.S. 20/20, while fields increased to 30 degrees in each eye and were not tubular.

of no avail. Most wore glasses, with refractive errors of all types represented. In only one was the ametropia of high degree, this being in the case of a hyperopia of seven diopters.

After suggestion, the corrected vision was improved to 20/30 or 20/40, and in some instances to 20/20. Here again the reading was slow and deliberate with long pauses between letters. This delay and great effort in reading frequently occurred whether the soldier was reading the 20/100 line or the 20/30 line. Fre-

Visual fields. Visual fields were plotted on the tangent screen rather than on the perimeter.* In all except one (case 6) the fields were tubular in character; in the one exception, although the fields enlarged as the distance from the screen was increased, the enlargement was by no means proportional. In this case the fields were also found to be considerably re-

* One of the black painted walls of the dark room was used as the tangent screen. This served well since it was possible to obtain privacy and quiet, both of which were desirable in testing these men.

duced. The usual plotted field, when a 4-mm. white test object at one meter was used, was found to be between 8 and 15 degrees in 13 (86 percent) cases. Use of the same test object at three meters gave identical fields (figs. 1 and 2). In the remaining two cases, very small fields between 2 and 4 degrees were obtained with no enlargement at three meters (fig. 3).

In addition to the tubular characteristic, certain peculiarities concerning the fields in these individuals are worthy of mention. First, the plotted fields were found to be uniformly round rather than with the normal increase temporally and temporo-inferiorly (fig. 1). If a 10- or 15-degree field was obtained, the isopter distance from the fixation point was as regular as though drawn by compass, and this finding persisted regardless of the distance from the fixation point. After a few points were plotted, all other points fell about the same distance from the center, and the examiner could usually surmise fairly accurately when the patient was going to see the test object. There was no tendency to concentric decrease of the fields on prolonged examination, a finding usually referred to as spiral fields. Although some books on perimetry mention this characteristic as observed in hysteria, Peter[1] and Traquair[2] carefully explain that spiral fields are seen in neurasthenia and not in hysteria. This observation has been constant in the cases being reported and helped establish these individuals as true hysterics and not as neurasthenics.

Secondly, little or no change occurred in the size of the field as the size of the test object was increased. In many of the cases the test object was increased from 4 mm. to a square of white paper four inches on edge, but the visual fields were unaltered. In cases 10 and 14 (table 1) where a 2- to 4-degree field was present, this extreme constriction persisted even when a sheet of white typewriter paper was used, a rather dramatic observation. This finding shows the steepness of the field margins that is marked in hysteria. Organic lesions rarely show this. In the small group reported here, this steepness of the field margins has been consistent and deserves further emphasis in describing the typical field changes in hysteria.

Visual fields after suggestion. In all but three of the cases the visual fields remained about the same after suggestion. In the three who presented alterations the changes indicated an increase in the size of the field to about 30 or 40 degrees; thus the field was larger than originally but still constricted. The circular contour and steep edges remained.

Near vision. In about half of the cases the near-vision, results as tested with the Jaeger chart did not correlate with the distance vision. In six instances (40 percent), Jaeger 1 was read, usually with ease, although distance vision was 20/100 or 20/200. Apparently the patients had no insight into the inconsistency of this finding and once more malingering came to mind.

Discussion

An interesting group of 15 cases of hysterical amblyopia was reported by Halpern[3] while stationed at a preëmbarkation camp. In these instances the amblyopia developed acutely while the individuals were awaiting overseas duty, and all improved on hospitalization without any specific therapy. The vision was usually 20/100 or 20/200, with extremes of 20/60 and 10/400. The majority gave no previous ocular history. The fields were usually tubular and below 20 degrees, but in two cases no field changes were found. Pupillary and corneal reflexes were usually normal, and no marked refractive errors were present.

Mahoney and Linhart[4] observed 13

TABLE 1

EYE FINDINGS IN 15 CASES OF HYSTERICAL AMBLYOPIA

Case	Age years	Maximum Corrected Vision		Visual Fields	Other Findings
		First Examination	After Suggestion		
1	36	O.D. 20/70 O.S. 20/70	O.D. 20/30 O.S. 20/30	15′, tubular	None
2	24	O.D. 20/100 O.S. 20/100	O.D. 20/40 O.S. 20/40	8′, tubular	Myopia (3D)
3	33	O.D. 20/100 O.S. 20/100	O.D. 20/30 O.S. 20/30	10′, tubular	Myopia (2D); Jaeger 1 read easily
4	21	O.D. fingers O.S. 20/200	O.D. fingers O.S. 20/20	8′, tubular	Convergent strabismus right, with amblyopia; Jaeger 1 read easily
5	39	O.D. 20/100 O.S. 20/100	O.D. 20/30 O.S. 20/30	15′, tubular	Myopia (1D); Jaeger 1 read easily
6	21	O.D. 20/100 O.S. 20/200	O.D. 20/30 O.S. 20/50	20′, not tubular, but not proportionate for distance	Alternating esotropia; Jaeger 1 read easily
7	21	O.D. 20/100 O.S. 20/200	O.D. 20/30 O.S. 20/50	10′, tubular	Compound hyperopic astigmatism, moderate
8	20	O.D. 20/200 O.S. 20/200	O.S. 20/30 O.S. 20/30	10′, tubular	Fields not tubular after suggestion
9	31	O.D. 20/100 O.S. 20/70	O.D. 20/40 O.S. 20/30	15′, tubular	None
10	37	O.D. 20/70 O.S. 20/20	O.D. 20/30 O.S. 20/20	2′, tubular (right); 4′, tubular (left)	Myopia (2D); 30′ fields after suggestion
11	22	O.D. 20/100 O.S. 20/100	O.D. 20/40 O.S. 20/40	10′, tubular	Hyperopia (7D); Jaeger 1 read with effort
12	26	O.D. 20/70 O.S. Light perception	O.D. 20/20 O.S. Light perception	10′, tubular	High mixed astigmatism, O.S., with amblyopia
13	26	O.D. 20/100 O.S. 20/100	O.D. 20/100 O.S. 20/100	8′, tubular	Bilateral mixed astigmatism, moderate
14	25	O.D. 20/100 O.S. 20/200	O.D. 20/30 O.S. 20/40	2′, tubular	Jaeger 1 read easily
15	25	O.D. 20/30 O.S. Light perception	O.D. 20/30 O.S. Light perception	10′, tubular	Divergent strabismus, left, with amblyopia; Jaeger 1 read easily

instances of this condition among servicemen. The amblyopia was bilateral in all but one instance. These cases were more chronic than in Halpern's series but of milder degree, with corrected vision usually between 20/40 and 20/100. Fields were typical. In this group life-long histories of poor vision were the rule, and most were emotionally immature, with poor intellectual endowments. These soldiers were similar to the ones reported in this paper.

Nature of hysterical amblyopia. Moersch[5] has succinctly described this as "that convenient curtain that shuts out unpleasant experiences from visual mem-

ory." In 1930 Spaeth[6] presented an excellent review of hysterical amblyopia and its background. He explained that the hysterical make-up from the standpoint of personality defects was manifested by a poor synthesis of the personality. This made it possible for certain groups of ideas to drop from an effective association with the main portions of the personality and to occupy a region first called and explained by Janet[7] as the "subconscious."

Hysterical anxiety with conversion phenomena is the manifestation of a higher psychologic mechanism, and generally represents an unconscious wish. When situations of extreme difficulty arise there are but two alternatives—fight or flight. However, according to Janet's theory, an hysterically constituted person may develop a compromise situation between instinctive cravings and what external reality permits. He does this by taking on some bodily incapacity as a legitimate excuse for abandoning the struggle and thereby squaring his own conscience. It is thus a flight from reality or a "flight into sickness." Such a reaction represents a partial break in mental control; that is, a shutting off of recognition by the psyche of some organic function. In hysterical amblyopia this would be the inability to see, although the eyes anatomically are capable of vision.

The hysterical conduct may be infantile and ineffectual but it represents that particular person's most efficient way of meeting and adjusting to a situation. As Freud[8] has shown, repression is the fundamental factor and the basis of hysterical manifestations. These individuals suffer from reminiscences, and their symptoms are the remnants of certain experiences. They have driven these experiences out of consciousness and out of memory, in this way saving themselves a great amount of psychic pain. However, they still exist in the subconscious only waiting for their chance to become active and finally succeed in sending into consciousness a distinct but unrecognizable form of the repressed idea—which is the symptom.

Wechsler[9] in his "Textbook of clinical neurology" explains that there is hardly a sign or symptom of organic disease which hysteria cannot simulate. It is the most protean disease in the whole domain of medicine.

Monosymptomatic hysteria is not at all uncommon, but the greatest number of cases present a variety of manifestations.

In this group, the predominant symptom was poor vision, but on going further into the history the psychiatrists uncovered other complaints and findings which fitted into the picture of hysteria. The majority, therefore, were not monosymptomatic but presented multiple symptoms.

For convenience, the hysterical amblyopias have been divided into three broad groups: 1. Acute—the amblyopia develops suddenly, and the course is usually short. 2. Chronic—the condition has existed for some considerable time, does not have a definite time of onset, and the course may be complex. 3. Mixed—in addition to hysterical amblyopia, other elements of psychoneurosis or neurasthenia are also present and frequently are the more obvious factors in the individual.

The more common ocular findings in hysteria as described by Head[10] are amblyopia, photophobia, corneal anesthesia, ptosis, blepharospasm, diplopia, lacrimation, and intermittent attacks of blindness. Most of the cases in this report belonged to either the chronic or mixed category, and the outstanding finding was the amblyopia.

What is accomplished by suggestion? It is generally agreed that suggestion is the most important factor in the treatment of hysteria,[7, 8, 9, 11] and this holds true in

the case of hysterical amblyopia as well. Earlier in the paper the method of suggestion used in these cases was outlined briefly. It was felt that these individuals could not adjust to their setup in service, although no severe difficulty had been encountered previously in civilian life. Basically the line of suggestion employed emphasized that because of the present poor vision they could not be discharged or "separated" from the Army. Hope was maintained by suggesting another examination after "resting the eyes."

The hysterical amblyopia probably had developed because the individual could not get along in service although he did not realize or admit this in his consciousness. Now the defective vision, which was the soldier's method of adjustment to the Army, however inadequate, was resulting in his remaining in service. Obviously the symptom (amblyopia) was no longer serving the desired purpose, and so vision was regained.

The suggestion was brief and the explanation of the resulting mental process crude but probably near the truth in most instances. The belief that the underlying factor in these cases of hysterical amblyopia was the inability of the soldier to adapt to the Army was assumed, and may not have been the cause at all in some of these individuals. Thus in case 13 no improvement in vision was obtained after suggestion, so that perhaps the Army was not his difficulty and discharge was not the remedy.

Since hysterical amblyopia is rare in civilian life,* especially in males, whereas it is relatively frequent among those in service, it is probable that factors in Army life are the important cause of hysteria.

Although the improvement in vision obtained in this series after suggestion was probably only transient and by no means a cure, this finding aided in the diagnosis of the condition. It also helped in establishing the fact that the individual was capable of good vision and removed the element of doubt and error which always should be in the mind of the examiner in making the diagnosis of a functional condition.

Differentiation between hysterical amblyopia and malingering. Moersch[5] emphasizes the point that although "hysteria is used frequently in place of malingering, the two terms are not at all synonymous." However, the diagnosis of malingering is frequently difficult and in service becomes an especially inviting pitfall. As stated by Shelton,[12] "the examination of the malingerer becomes a battle of wits, and he may make you feel that your years of special training were spent in a kindergarten."

Fundamentally, the hysterical person is largely if not wholly unconscious of the unreality of his symptoms. He deceives himself and others without design or malice, often without demonstrable motive, although this exists. The malingerer, on the other hand, deceives willfully and knowingly; he realizes the falseness of his complaints and findings. Both the malingerer and the hysteric are frequently of poor emotional and psychiatric quality, however, and the examiner may be hard put to distinguish the two.

The malingerer may have symptoms of hysteria, and hysterics may simulate. Trapping a patient with amblyopia into seeing is not proof of malingering. Trickery may suddenly arouse attention in hysteria, and therewith sensation. The differentiation between the two conditions can be made, however, and is of the utmost importance, since the treatment and handling of such patients depends upon the diagnosis. Several factors will aid in differentiation and when assembled will lead to the correct diagnosis:

* Wechsler states that he has rarely encountered hysterical amblyopia in civilian practice.

1. The hysteric is indifferent and nonchalant in regard to his ailments and does not seem particularly upset about the amblyopia. The malingerer, conversely, is worried about his condition; frequently, too much so.

2. In hysterical amblyopia the subject has no difficulty in getting about and rarely bumps into objects or hurts himself, even though his fields may be markedly constricted. The malingerer, however, is "blinder than blind," often completely helpless. Eggers's[13] description is characteristic of their "sometimes affecting difficulty in walking about in dim illumination although the peripheral fields were normal. Invariably they overplayed their part."

3. While the hysteric revels in examination, no matter how long or how often repeated, the malingerer loathes this, is sulky, resentful, and not coöperative.

4. In hysteria the amblyopia is usually bilateral, in the malingerer more frequently unilateral.

5. Varying degrees of visual acuity obtained through "trick tests" is uncommon in hysteria, whereas frequent and very suggestive in malingering. Again, though, these so-called malingering tests should not be the sole basis for differentiation, since hysteria will give positive results in some instances. The person with true hysteria may respond to these tests in the same manner as the simulator.

6. The results of the peripheral-field examination are outstanding and characteristic in hysteria. The tubular, concentric field with steep borders, proved by constancy with varying-sized test objects, and often showing a reversal of color fields, are usually diagnostic of hysteria. With these findings the burden of proof rests on the examiner to disprove hysterical amblyopia and to diagnose malingering. Few malingerers can deceive intelligently on fields.

Of the 15 cases of hysterical amblyopia reported here, none was diagnosed as such before referral to the Separation Center. This was more probably due to the omission of perimetric examination than to any other single factor. In several instances, before the correct diagnosis was made, the possibility of malingering was strongly present in the mind of the examiner, especially when "trick test" results such as reading Jaeger 1 with 20/200 corrected distance vision were obtained. It was only after the complete data were assembled that the tentative impression of malingering could be shown to be false. There have been ocular malingerers at the Separation Center, but these have been rare compared with the occurrence of hysterical amblyopia.

It may be said that a tentative diagnosis of hysterical amblyopia should be strongly considered in an individual with bilateral amblyopia and no organic findings who previously has had good vision.

Evaluation of disability. These soldiers with hysterical amblyopia have filed claims with the Veterans' Administration, and the problem arises of evaluating the amount of existing disability. I do not believe any of this group were familiar with disability ratings. Many would not have filed claims except that they were urged to do so because of possible disability.

In the United States Veterans' Administration "Schedule for disabilities," March, 1933, maximum vision of 20/200 in each eye (such as in case 8) is entitled to 60 percent disability; 20/200 in one eye and 20/100 in the other to 50 percent disability (cases 2, 3, 5, 11, 13), and so forth, depending on the vision. No mention is made as to whether the cause of the poor vision is organic or functional as long as certain requirements as to the methods of testing are fulfilled.

On page 40 in the "Schedule for disabilities" certain disability ratings are

listed for diminution in the peripheral visual fields. Thus, bilateral concentric contraction of the fields to 10 to 30 degrees is judged to be a 40-percent disability, whereas contraction to less than 10 degrees in each eye is ruled a 100-percent disability. However, this table has a note which wisely states that "demonstrable organic pathology commensurate with functional loss will be required," and that "ratings for functional contraction or field losses will not exceed ratings for hysteria."

Reference to disability compensation for hysteria groups this condition with other types of psychoneurosis. Five groups are distinguished, depending upon the amount of subjective and objective symptomatology and the amount of social and industrial incapacity. The determination of ratings is dependent upon difficulty in the veteran's economic adjustment; that is, impairment of earning capacity. The type of disorder, severity, persistence, and continuity of the symptoms are also considered.* Disability ratings for the designated five classes of psychoneurosis are 0 percent, 10 percent, 30 percent, 50 percent, and 80 percent.

Since the ocular findings in these cases are only a manifestation of hysteria and not due to any demonstrable pathologic process in the eyes, the disability ratings should be on the basis of the severity of the hysteria.

* Manual for Medical Examiners of the Veterans' Administration, January, 1940.

Conclusions

1. Fifteen cases of hysterical amblyopia were observed at the Separation Center at Fort Snelling, Minnesota. This was an incidence of 1.03 percent among those discharged for organic or mental disability.

2. The testing of peripheral visual fields was the most important aid in the attempt to arrive at the diagnosis.

3. Differentiation between hysterical amblyopia and malingering is usually possible and should be made, since the treatment and handling of the patient is dependent on the correct diagnosis.

4. Disability ratings in hysterical amblyopia should be based on the severity of the hysteria and not on the amount of visual or field loss.

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NOTES, CASES, INSTRUMENTS

ACCESSORY LACRIMAL GLAND ON THE CORNEA

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The occurrence in man of a corneal tumor composed solely of glandular tissue entirely analogous to that of the lacrimal gland has not, so far as is known, been previously reported in the literature. Under the circumstances the findings in such a case, recently encountered, are deemed worthy of record.

A private, U. S. Army, colored, aged 28 years, was admitted to a General Hospital with the complaint of "poor sight due to the lump on my right eye." This "lump" had first been noticed in 1928, when he was 13 years old, at which time it was concealed by the lower lid. It had been completely asymptomatic until the past five years, when a slight but progressive impairment of vision had developed. Six months before this hospital admission minor "tear-gas" stimulation had occurred, which he believed had resulted in a mild residual excess lacrimation of the right eye.

The physical examination, other than of the eyes, was negative for any evidences of hereditary, developmental, or acquired changes of a pathologic nature. The blood, urine, and spinal-fluid examinations and X-ray studies of the orbit and skull were normal. The stool examination revealed mild ankylostomiasis.

The eyes were normal except as noted. The right eye presented (figs. 1, 2) a pink, nonbleeding, soft tumor, 8 by 8.5 by 3 mm., of which 2.5 mm. extended over the bulbar conjunctiva, centering in the 7-o'clock position and 6 mm. over the cornea. The entire mass was covered with glistening, nonvascularized epithelium, and was firmly adherent to the cornea. Two small arterial loops, with accompanying venous drainage, were present at the 6:30- and 7:30-o'clock positions, issuing from the bulbar conjunctiva. Superior and parallel to the upper edge of the tumor, and separated from it by 1 mm. of clear cornea, was an arcuate corneal opacity, 1 by 8 mm. in size, resembling arcus senilis, with incorporated pigment which appeared tc consist of melanin granules. The cornea measured 13 mm. horizontally and 13.5 mm. vertically. The pupil of the right eye measured 6 mm., that of the left 5 mm., becoming 4 mm. and 3 mm., respectively, on stimulation with a flashlight. The vision was: O.D. 20/200 and J8 improved to 20/70 and J5 by a +.50D. sph. ⊂⊃ −2.00D. cyl. ax. 85°; O.S. 20/50 and J3 improved to 20/30 and J2 by a −1.00D. sph. ⊂⊃ −.50D. cyl. ax. 90° (full homatropine cy-

Figs. 1, 2, 6 (Dame). Clinical appearance of accessory lacrimal gland on the cornea. Fig. 1, The tumor and its vascular supply. Fig. 2, Partial concealment of tumor by lower lid. Fig. 6, Postoperative appearance of the eye.

* Chief of EENT Section, Surgical Service, General Hospital, U. S. Army.

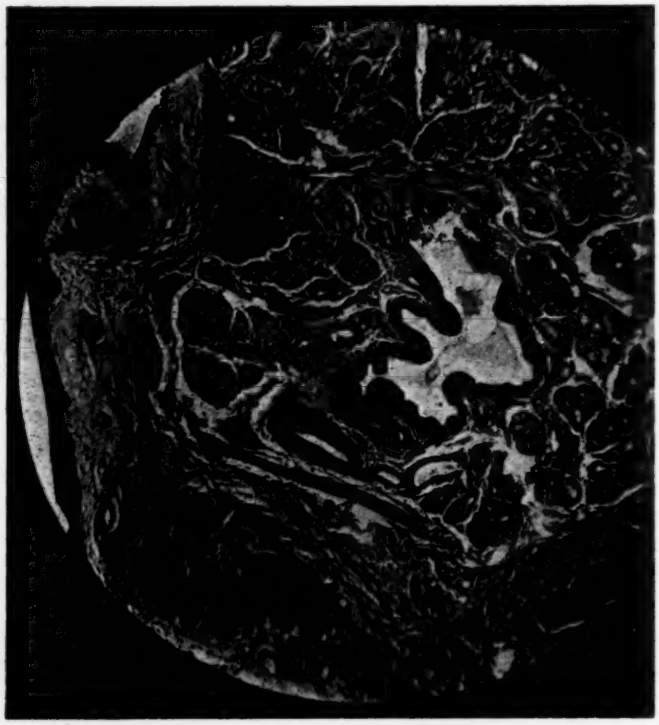

Fig. 3 (Dame). Low-power photomicrograph, showing racemose structure and duct of accessory lacrimal gland on cornea. (Museum and Medical Arts service, Neg. D4317, U. S. Army Medical Museum.)

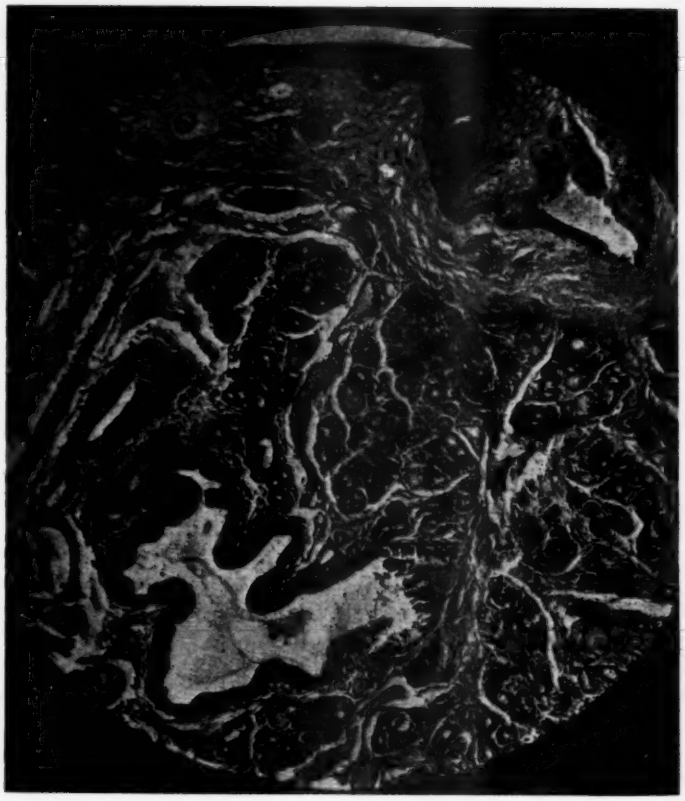

Fig. 4 (Dame). Medium-power photomicrograph, showing collecting tubules and main duct of accessory lacrimal gland on the cornea. (Museum and Medical Arts Service, Neg. D4317, U. S. Army Medical Museum.)

cloplegia). Color confusion in the right eye was present to both Ishihara plates and colored yarns. The visual field was contracted (3/330/wh/9 C. P.) to an irregular 30-degree field. The left eye was normal except for an equal amount of

ture (figs. 3, 4, 5) resembling normal lacrimal tissue.

The *pathologic report* of the tissue (Major J. H. Bragdon) was as follows: "The specimen consists of a small soft fragment of grey-pink tissue 4 by 2 by 2

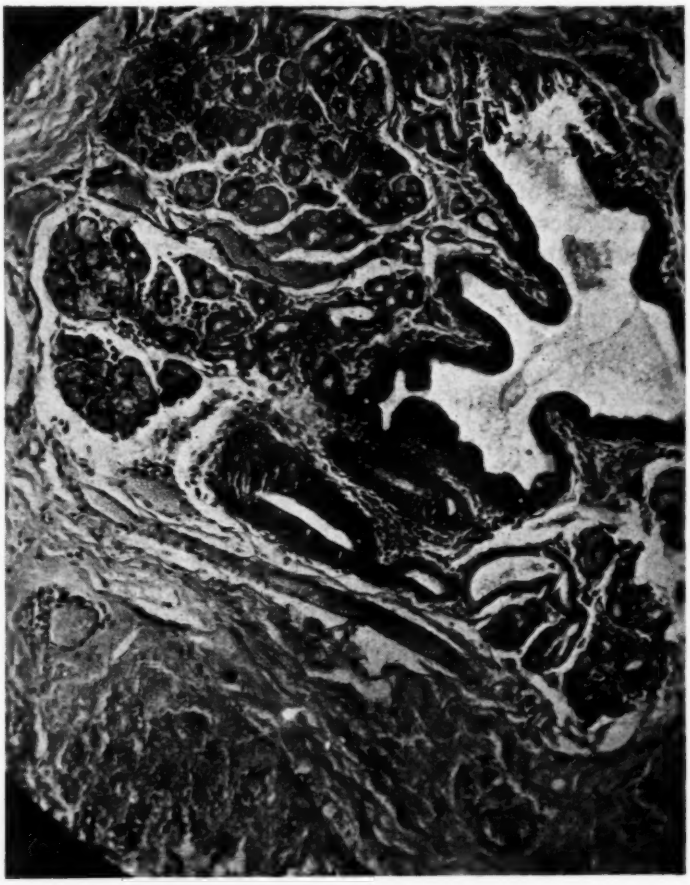

Fig. 5 (Dame). High-power magnification of racemose structure and duct of accessory lacrimal gland on cornea. (Museum and Medical Arts Service, Neg. D4317, U. S. Army Medical Museum.)

megalocornea, the refractive error as noted, and a 15-degree visual-field contraction.

The tumor was removed without incident by scissor dissection under procain anesthesia. Microscopic examination revealed 80 percent of the tumor to be of normal-appearing tubulo-acinous structure

mm., one surface of which appears to be epithelized.

"Microscopic section shows well-formed acini of what is apparently a functioning lacrimal gland. In some sections the excretory duct is seen. The gland is surrounded by a loose connective tissue, which, in turn, is covered by stratified

squamous epithelium. There is no evidence of inflammation or of tumor. *Diagnosis:* Ectopic lacrimal gland."

Convalescence was uneventful, and the cornea healed well with an opacity (fig. 6). The tear production was 20 mm. for the right and 18 mm. for the left eye during a five-minute period, on red litmus-paper strips. Fluorescein appeared on the floor of each nostril in 10 minutes. The patient was returned to the United States because of poor vision.

The embryologic background for the development of anomalies of the orbit and its contents, including accessory lacrimal glands, has been adequately summarized elsewhere.[1, 2] Accessory lacrimal glands have been reported in many intraorbital locations, but this is, so far as is known, the first tubulo-acinous structure involving the cornea.

SUMMARY

The occurrence of a corneal tumor, composed solely of tubulo-acinous glandular tissue entirely analogous to that of the lacrimal gland, is reported and, so far as is known, for the first time. Photographs of the eye and photomicrographs of the tumor structure are included.

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HERPES ZOSTER OPHTHALMICUS WITH VARIED COMPLICATIONS

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Although herpes zoster ophthalmicus is a rare disease, the literature contains a voluminous record of its course and of many of the conditions that arise in conjunction with it. Recently, Edgerton* described comprehensively the salient factors of the disease and its complications.

There has recently come under my care, however, a case which, because of its extremely unusual variety of complications, merits report. The sequence of conditions that occurred is as follows: acute herpes zoster ophthalmicus, nonulcerative keratitis with iritis, complete external ophthalmoplegia with ptosis, exophthalmos, and finally, several months later, violent iridocyclitis. Such a variegated list of complications involved almost every part of the eyeball with the exception of the optic nerve, and demonstrated how extensively this disease may damage the globe and its adnexa. The globe has been reported as being involved in approximately 50 percent of the cases of herpes zoster ophthalmicus and the cornea in about 33⅓ percent of such cases. In the case to be described, corneal involvement occurred during the second week and manifested itself as a subepithelial group of round punctate gray dots 2 to 3 mm. in diameter and some even larger, which were located near the limbus and extended upward toward the central cornea from the 5- to the 9-o'clock position. The corneal epithelium did not become stained with fluorescein, but several folds in Descemet's membrane were present and the cornea showed diffuse edema. This

* Edgerton, A. E. Arch of Ophth., 1945, v. 34, July, pp. 40-62; August, pp. 114-153.

condition subsided after four weeks' progress of the disease, leaving permanent gray corneal opacities scattered throughout the affected area. Considerable iritis was present during the course of this complication, with sharp pain, and this involvement subsided in conjunction with the keratitis.

During the prodromal and acute vesicular stages of the eruption, there occurred extensive edema of the upper lid and less of the lower lid, with almost complete closure of the eyelids. During the eighth week of the disease, however, this edema had largely disappeared, when suddenly the patient noted diplopia with inability to raise the upper lid. In a few days there occurred gradually increasing proptosis of the eyeball with limitation of motion in all directions of gaze. The Hertel exophthalmometer revealed 5 mm. of exophthalmos. This complication of the disease lasted for eight weeks. Its cause has been ascribed to excitation of the sympathetic fibers of the superior cervical ganglion or to muscle atony when it is accompanied by oculomotor-nerve paralysis. Another explanation attributes the proptosis to extraocular-muscle paralysis due to thrombophlebitis within the muscle tissue. The complication of exophthalmos occurring in the course of herpes zoster ophthalmicus is rather rare and has been recorded only a few times; in my case the exophthalmos and muscle paralysis lasted for eight weeks, with muscle function slowly and gradually returning accompanied by recession of the exophthalmos. The complication of the ocular-muscle paralysis occurring during the course of this disease has been reported in percentages varying from 7 to 24 of all cases; in the case under discussion the oculomotor paralysis occurred during the eighth week of the disease, and a substantial lapse of time took place between its onset and the subsidence of the skin lesions. However, the literature reveals that muscle paralyses do occur at varying intervals during the course of the disease; some investigators have reported paralysis occurring even prior to the cutaneous eruption. In my case, the 3d, 4th, and 6th cranial nerves were involved, and the return of function to the affected muscles was a slow procedure involving 2 to 3 months' time; the muscle abnormality definitely outlasted the exophthalmos, and there was quite definite partial external ophthalmoplegia and ptosis when the exophthalmos had completely receded. This residual paresis completely disappeared within an additional month and ocular motility was then normal, although elevation of the upper lid was somewhat less than normal. The manner in which the ocular-muscle paresis occurs has been attributed to extension of the infectious process to the motor branches of the nerve as it passes into the superior orbital fissure; other theories have attributed the process to an involvement of an associated basal meningitis with nuclear lesions and resultant muscle dysfunction. As previously stated, according to a third theory such muscle paresis results from intramuscular hemorrhages following a thrombophlebitis. These ideas seem to be somewhat in the realm of conjecture, especially in the absence of positive spinal-fluid findings, but in a few cases spinal-fluid examination has revealed a lymphocytosis and occasionally a leucocytosis. These findings would corroborate the extension of the disease to the meninges. From an anatomic and pathologic point of view it would seem that a "spilling over" of the infectious process from sensory to motor branches would be a more logical explanation, in as much as the first branch of the 5th nerve sends out sensory ramifications to all the motor nerves of the eye before it enters the orbit. It is usual for the muscle paralysis to

clear up completely, although, as has been stated, the required length of time varies greatly.

One of the most interesting phases of the case under discussion was the appearance of an extremely severe iridocyclitis nine months following the onset of the disease and following a period of three months during which the patient had been symptom free with the exception of an occasional attack of neuralgia over the affected scalp area. During the early weeks of the disease the iris had shown signs of congestion with one stromal hemorrhage, but this condition subsided following the healing of the keratitis; then, at a time when the patient was apparently well on the way to recovery, there suddenly occurred severe pain, photophobia, and blurring of vision with descemetitis and vitreous opacities. This sequence has been reported previously, but it is relatively rare as such a late complication. The usual symptoms of iridocyclitis were magnified to such a degree together with the appearance of an hypopyon 2 mm. in depth that hospitalization was again required and three weeks of intensive care were necessary before relief was obtained. Atrophy of the iris of moderate degree resulted together with a slight amount of enophthalmos. Two months following the onset of this complication the eye was again quiet and has remained so up to this date (14 months following the onset of the disease). After such a series of complications involving so many parts of the eye, the vision was, of course, substantially impaired, owing to corneal opacities and global shrinkage.

This course of events exemplifies the manner in which this disease may affect an apparently healthy person and the extremely severe damage that it may inflict upon the eyeball.

Case report. Mrs. A. D., aged 54 years, a white American housewife, was first seen 48 hours following the onset of severe pain in and around the right eye. At this time there were moderate edema and redness of both eyelids with very definite ciliary congestion of the eyeball. The cornea was slightly hazy; pupillary reaction was normal, and the media and fundus were normal. The temperature was 99.2°F., pulse 82, respirations 24. The red blood count was 4,900,000; white blood count 9,200. The patient was extremely obese; physical examination was negative. A definite diagnosis could not be made at this time, but the possibilities of herpes zoster ophthalmicus and erysipelas were considered. Symptomatic treatment for the pain was given. The neuralgia became increasingly severe during the next two days, requiring vigorous sedation, and when the patient was next seen, three days later, the typical skin vesicles were present, extending down to the tip of the nose, involving the eyelids and the right half of the scalp but sharply demarcated at mid-line. The diagnosis was obvious, and treatment was instituted to control the symptoms; no convalescent serum was available.

One week following the onset of the disease, the cornea showed subepithelial punctate deposits which were accompanied by diffuse epithelial bedewing. There was no stain with fluorescein at any time. The pupil was widely dilated with atropine, and the corneal involvement lasted for approximately four weeks, gradually subsiding, but the residual opacities remained as previously described.

During the next weeks the neuralgic pains became somewhat less severe, but the globe remained considerably congested, with moderate edema of the eyelids. The eye remained more or less in this condition until the eighth week of the disease, when diplopia was noted by the patient, and there occurred complete external oph-

thalmoplegia accompanied by proptosis of the eyeball, which took place within five days. This condition, which resulted in 5 mm. of exophthalmos, was unchanged during the ensuing month. Following this period some degree of ocular motility was regained. Muscle function gradually increased, and, following a period of eight weeks, ocular motion was again normal, although there was still present a slight amount of exophthalmos with some ptosis of the upper lid. These conditions returned to normal within another two-week period.

The patient now felt much more comfortable and was practically symptom free for a period of three months. However, nine months following the onset of the original symptoms, there suddenly occurred extreme photophobia with tearing and further loss of vision, and there took place a typical attack of violent iridocyclitis. This required hospitalization of the patient, in an attempt to curb these developments with typhoid-vaccine therapy. Following the initial dose of typhoid, however, a severe tachycardia resulted and medical consultants felt that in view of this condition, and the patient's obesity, further typhoid therapy would be inadvisable. Routine treatment with atropine was given, and after four weeks this condition improved greatly. This involvement occurred about 10½ months after the original appearance of herpes zoster ophthalmicus.

The vision in this eye previous to the disease was 20/20 corrected; following this series of complications the corrected vision is 20/100. The eye is now quiet, although there remains some redness and slight edema of both lids, and a somewhat pronounced corneal leukoma extending 2 to 3 mm. upward from the limbus from the 5- to the 9-o'clock position. The skin eruptions have resulted in scarring throughout the affected area. The patient has an occasional severe neuralgic pain, especially upon exposure to cold, and the eyeball has become somewhat atrophic owing to the severe iridocyclitis.

Such a variety of complications occurring during such an unusually long lapse of time demonstrates very vividly the manner in which this stubborn infectious process may involve most of the important parts of the eye with resultant impairment of their function.

520 Commonwealth Avenue.

A SIMPLE METHOD FOR THE EXACT MEASUREMENT AND PLACEMENT OF RECESSION SUTURES

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The success or failure of a muscle operation is dependent on the exact amount of resection or recession.

In the accepted technique of applying the calipers to find the scleral point for new insertion, one is faced with the problem of exactly what points are to be considered as the anatomic insertion. One point seems to be well agreed upon; that is, that the medial rectus is inserted 5.5 mm. from the limbus. According to Whitnall, the measurements made by Fuchs (1884) were taken from the largest series of eyes and are most widely accepted.* His figure is also 5.5 mm. While the lines of insertion of the muscles are not perfectly straight, still those of the medial and lateral recti are most nearly so. The line of insertion of the medial rectus is straight, or slightly convex forward.

The recti insert by means of "thin, flat glistening tendons, formed by parallel rectilinear fasciculi of connective tissue, without anastomoses, but weakly united

* Whitnall, S. E., Anatomy of the human orbit. Oxford Edition, p. 266.

by transversely placed and easily separable fibres. Some of the fasciculi leave the main layer to be inserted separately as far back as 1 to 5 mm. behind the remainder of the tendon fibres." Consequently, after the muscle is cut from its insertion and the operator looks down on the stump, he is faced with a picture of thinned, indefinitely inserted fasciculi anteriorly, blending intimately with, and almost indistinguishable from, the superficial fascia bulbi and even superficial scleral fibers. Posteriorly, as has been pointed out, the stump ends indefinitely as far back as 5 mm.[1] Of course, the experienced eye surgeon will pick that point which, in his opinion, is the true insertion of the muscle.

The method I wish to suggest is to pick a much more distinct point to start from; namely, the limbus of the cornea. As has been explained, since the distance of insertion of the medial rectus is quite uniformly 5.5 mm. from the limbus, this distance, plus the amount of recession to be done, can be measured from the limbus. It is best to use the exact horizontal meridian of the limbus to measure from, and extend the scleral point of identification straight up and down, and pick points along this line corresponding to the width of the tendon, if one wants to spread the muscles properly. I suggest the 9:00-o'clock position and the drawing of the straight vertical line with the calipers.

To avoid injury to the cornea from the sharp points of the calipers, the points may be filed smooth and round.

Modification of the recession operation. 1. The internal rectus is exposed and picked up on the muscle hook. 2. A single-needle catgut suture is whipped around the upper border of the muscle close to the muscle hook, and the suture is locked to prevent slipping. 3. A similar suture is applied at the lower border. A small suture clip is applied to the ends of each suture. 4. The assistant lifts up the two catgut sutures vertically, putting the tissues on tension. 5. The muscle is severed close to its attachment. 6. While the assistant still holds the two catgut strands, a third catgut suture is whipped around the cut edge of the muscle at its center and locked. 7. A pair of calipers set at 10 mm. is applied to the eye from the corneal limbus to the sclera on the horizontal meridian. This provides absolute measurement for muscle recession. 8. The central catgut suture is now applied to the sclera at the central caliper marking. 9. The upper and lower catgut sutures are applied vertically above and below this central point. 10. The central suture is now tied; the upper and lower sutures are similarly tied. This procedure presents three sutures in line, giving added strength to the muscle attachment. 11. The caliper measurement is absolute and does not vary as it would in measuring ordinarily from the muscle stump. 12. The conjunctiva is sewed with continuous silk.

Summary

1. In order to recess a muscle more accurately, it is suggested that one measure from the limbus rather than from the original muscle insertion, adding the amount of recession desired to the normal anatomic measurements between limbus and original insertion.

2. The recession operation is simplified, eliminating the use of the muscle forceps, which traumatizes the muscle and introduces an error of 1 mm.

1882 Grand Concourse.

A NEW TYPE OF SURGICAL PEG

Sidney A. Fox, Lt. Col. (MC), A.U.S.
Martinsburg, West Virginia

Those who have done any amount of plastic surgery have been bedeviled at one

time or another by the rubber pegs used to prevent sutures from cutting through tissues. Especially in these days it is hard to get the proper type of rubber. Often the pegs dig into the tissues and macerate the skin. Passing sutures through a tiny square of rubber is, moreover, a nuisance, is time consuming, and requires the help of an assistant.

After some experimenting with various methods and materials, the following technique was evolved which has proved very satisfactory:

A rectangle of oiled silk, measuring 2¼ by 4 inches, is carefully folded into three thicknesses along its length, giving a triple fold of oiled silk measuring ¾ by 4 inches. It is then stitched on a sewing machine along the border which does not have the free edge. This stitching is placed one-fourth inch from the edge. It is kept in 70-percent alcohol until ready for use.

When needed, the needles are passed through the stitched edge easily and rapidly and a peg of any desired size is cut from the whole piece (fig. 1). The same can be done after the needles have been passed through tissues. One such piece of oiled silk suffices for 12 to 16 pegs, depending on the size desired. These pegs are soft enough so that they do not macerate the skin and sufficiently firm to prevent cutting the tissues.

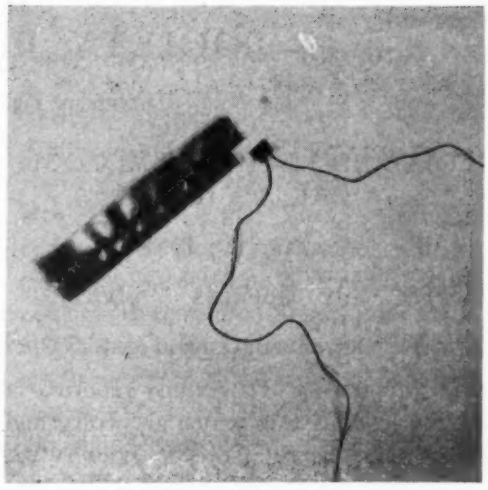

Fig. 1 (Fox). New type of surgical peg.

Newton D. Baker General Hospital.

SOCIETY PROCEEDINGS

EDITED BY DR. DONALD J. LYLE

COLORADO OPHTHALMOLOGICAL SOCIETY

January 20, 1945

DR. GUY HOPKINS, *president*

NEW INJURY, DIPLOPIA FROM OLD INJURY

DR. WILLIAM H. CRISP reported a medico-legal case in which an injury had occurred to the right eye on January 22, 1944. The left ocular adnexa of this patient had been injured 18 years before. The recent injury was caused when the blade of a heater fan came loose and struck the right side of the patient's face, cutting the nose and upper eyelid. The patient, aged 23 years, was a truck driver. Unfortunately, no written record of the case had been made at, or shortly after, the time of the recent injury, but the broad statement was made that, when seen by an ophthalmologist three days after the injury, the right eye showed vitreous opacity, interpreted as due to hemorrhage. When first seen by Dr. Crisp, on June 1, 1944, the right eye was entirely quiet and appeared to be normal with the exception of a dense web of vitreous opacity through which, when the pupil was dilated, many details of the fundus could be seen rather clearly. This eye was almost without refractive error, and had shown vision (under cycloplegia) varying between 20/24 and 20/60, more frequently the latter. The movements of this eye seemed normal. Although there had been a limited cut in the upper eyelid, the eyeball itself showed no appearance attributable to injury except the vitreous web.

Since the recent injury, the patient had complained of double vision. The lower rim of the left orbit showed a marked displacement, due to fracture of the malar bone, with decided depression of the inner fragment, considerable displacement of the whole orbital floor downward, and a markedly lower position of this eye in relation to the right eye. The left eye had two diopters of mixed astigmatism, correction of which gave vision of only 20/50, although the internal ocular structures seemed normal, and there was no corneal nor scleral scar.

It seemed likely that, for many years, the right eye had been the better eye, and that the left eye had been practically ignored until the injury to the right side of the face. The Maddox-rod test showed from 3.5 to 7 centrads of right hyperphoria and 12 centrads of exophoria. There was crossed diplopia, and the images tilted away from one another at the upper ends. The records obtainable did not altogether exclude the possibility that the web of vitreous opacity might have existed prior to the injury of January 22, 1944. The patient was made more comfortable by wearing the astigmatic correction for the left eye, but he could not drive at night on account of disturbance by headlights. An opinion had been given that the visual loss from the recent injury should be based upon the present corrected vision of the right eye, without regard to the muscular imbalance.

CONGENITAL PTOSIS

DR. R. W. DANIELSON reported on a white child, aged 5 years. This child was first seen at the age of 17 months because of a ptosis of the right upper eyelid since birth. The upper-lid border was just below the center of the pupil. The lid would not elevate on looking up. This child was

seen by Drs. Bane, Sherwood, and Macomber, and surgical intervention was postponed.

On November 28, 1944, a Gifford and Puntenny modification of the Dickey operation was performed. On December 8th, there was a staining area on the cornea and severe entropion, the cilia rubbing on the cornea. A week later when considerable skin was removed from the upper lid, the entropion improved quite perceptibly. Five days after this, an ulceration of the cornea with hypopyon was treated with penicillin and sulfadiazine. On Christmas Day, the patient was much improved, and by December 29th, the hypopyon and ulceration had disappeared, although rather marked opacity remained. On January 1, 1945, the patient was provided with "moisture" glasses and was ordered to wear X-ray protective covering at night. On January 20th, the cornea showed faint stain. The lid elevated with the elevation of the eye and went down with the lowering of the eye. Palpebral fissures were about the same for each eye. It was noted that the right lid did not blink with facility and even seemed able to elevate slightly (a possible associated upturn of the eyes during winking).

Interstitial keratitis

Dr. R. W. Danielson presented the case of Mr. G. L. The patient, first seen on February 25, 1944, had a history of getting a foreign body in his left eye two days previously. A case of iritis of the left eye was found; the right eye was normal. Vision was: O.D. 20/20−3; O.S. 20/40 (uncorrected). The patient was treated with atropine and typhoid vaccine. On March 1st, he was improved, but just one month later, he was worse, with K. P.'s and corneal opacity beginning. There was no improvement by June 1st. Major Chadwick prescribed 14 hours' treatment in the fever cabinet. On August 9th, when the patient was still unimproved, more typhoid treatments were given, and all suspicious teeth were removed. Sulfonamides were also given. Six weeks later the right eye showed slight circumcorneal redness, but nothing else. Riboflavin and Bicophs were prescribed. The report on October 13th was: right eye—bedewing; K. P.'s and corneal opacity. From November 1st to 5th, 2,000,000 Oxford units of penicillin were administered with no improvement whatsoever. On November 6th, the patient was inoculated with malaria. Two weeks later the malaria reactions started. After six, the reactions terminated spontaneously. The malaria is the only treatment which has seemed to control both the opacification of the cornea and the inflammation. The patient's present condition shows marked opacity of the substantia propria, with K. P.'s and vascularization of each eye. Vision is: O.D. perception of hand movements; O.S. 0.2 (corrected).

Associated facts in this case show that the patient was rejected from the Army because of arthritis. He had secondary syphilis in November, 1936, and had been treated with bismuth and arsenic since then. On August 7, 1944, the Kahn test showed 2+, but was negative on November 2d. The patient also has old pulmonary tuberculosis with strong tuberculin reaction. Both the father and mother had tuberculosis. A brother is supposed to have a corneal opacity of one eye of inflammatory origin. The conclusion was that this patient had interstitial keratitis with anterior uveitis, probably an acquired form, which was possibly aggravated by tuberculous infection.

Chronic pemphigus

Dr. W. T. Brinton reported on Mrs. H., aged 60 years. One-and-a-half years ago her eyelids became red and inflamed

and have been gradually getting worse since that time. She first noticed sore, red spots at the inner canthus of the right eye; soon the other eye became involved. All teeth were removed, and a diagnosis of trench mouth was made. The eyes became increasingly sensitive to light, the lid inflammation progressed, and vision gradually became poorer. In recent months, the patient was troubled with lashes of the lower lids turning in.

In this case, the palpebral and bulbar mucous membranes were markedly involved and showed bands of fibrous connective tissue with shrinkage of mucosa, tending to obliterate the cul-de-sacs. More recently, both corneas have become involved with pannuslike, vascular encroachments from the limbus which interfere with vision. There is secondary iritis, and xerosis is present. There are lesions of the mucous membrane of palate and lips as well as nose. She has been troubled with a vaginitis for two years. In the two years, she has lost 100 pounds in weight.

Monocular multiple vision

Dr. F. Nelson reported on E. H., a white woman, aged 64 years. She was first seen on December 10, 1943, but had complained about multiple vision for five years. Diagnoses of cataract and glaucoma had been made on different occasions. The right eye had distinct monocular triple vision; the left eye, monocular double vision. There were supranuclear and cortical cataracts in both eyes. Tongue-shaped opacities, protruding from the periphery toward the pupillary area, were apparently causing prismatic apparitions. There were double focusing lenses in both eyes. The discs looked like glaucomatous excavations, but tension was never above 20 mm. Hg (Schiøtz). Vision was: O.D. with a −0.25D. sph. ⊂⊃ −2.00D. cyl. ax. 102°, 5/8 partly, and J1; O.S. with a −0.50D. sph. ⊂⊃ +2.00D. cyl. ax. 175°, 5/8 partly, and J1, at about 20 cm. distance. Additional plus correction did not improve near vision. A 1-percent pilocarpine solution, instilled once a day, completely eliminated multiple vision in both eyes. Refraction varied considerably, and vision deteriorated slightly during that year.

On October 18, 1944, this patient notified me that her left eye was losing vision rather rapidly in the lower part of the visual field. When she was examined on October 20th, the right eye showed no change, but the left eye had an almost total detachment of the retina, with extensive ragged tears in the upper temporal quadrant, apparently reaching almost into the posterior polar region. The detachment was operated on on October 23d, after temporary dissection of the upper and lower rectus muscles. Complete reattachment was achieved, with normal visual field for white and colored objects, but central vision deteriorated to 5/30. Double focus in the lens of the left eye became much more pronounced, so that this eye could see about the same with a −5.00 and a +8.00D. sph. The patient reads J2 with the left eye with only astigmatic correction of +2.00D. cyl. ax. 180°. The diagnosis was monocular, multiple vision. Double focus lens, O.U. Refraction difference increasing after retinal detachment, O.S.

NEW YORK SOCIETY FOR CLINICAL OPHTHALMOLOGY

March 5, 1945

Dr. Milton L. Berliner, *presiding*

Symposium on diabetes

Biomicroscopy of the diabetic eye

Dr. Milton L. Berliner presented

lantern slides illustrating some of the changes seen in the anterior ocular segment in diabetes by means of the biomicroscope.

Histopathology of the eye in diabetes

Dr. Louise H. Meeker presented lantern sides of histologic sections from eyes from diabetics showing various pathologic features.

Diabetic retinopathy

Dr. Herman Elwyn said that diabetic retinitis, or retinopathy, is an easily recognizable ophthalmoscopic entity characterized by: (1) small, round, and irregular hemorrhages, situated mainly in the area between the upper and lower temporal vessels and in the region surrounding the optic-nerve head; (2) sharply defined or confluent white exudates in the deeper layers of the retina; and (3) yellowish-white glistening exudates varying in size from a pinpoint to large irregular masses. The small, round, and deep hemorrhages occur only in diabetes and constitute the most characteristic feature of diabetic retinitis. When the small white exudates and the glistening deposits are also seen, the complete picture of diabetic retinitis is present. This characteristic picture does not occur in any other disease.

The ophthalmoscopic picture is at times complicated by changes in the retinal vessels and their consequences, such as: aging, arteriosclerosis, contraction of small vessels, obstruction of a venous branch, and an episodal arteriospastic retinopathy. There is no causal relationship between these changes and those of diabetic retinitis. Some of the severe cases of diabetic retinitis are characterized by large retinal hemorrhages which rupture into the vitreous. A few cases are characterized by the proliferation of newly formed vessels in the retina and the vitreous which are covered by a connective-tissue layer, different in appearance and genesis from the retinitis proliferans following partial absorption of a hemorrhage in the vitreous.

Hyaline and lipoid deposits occur in any tissue that suffers from insufficient nutrition and oxygen supply. Such a condition must be present in the retina in the areas where the exudates are found. The small hemorrhages occur by diapedesis through the walls of the capillaries due to a condition of prestasis. That there is in the retina a chronic prestatic condition with a slowing of the circulation in the capillaries is also shown by the hyaline and lipoid deposits, which indicate a disturbed nutrition of the retinal tissue. To explain the prestasis in the retinal precapillaries, with the resulting small hemorrhages, several factors require consideration: The hemorrhages occur in diabetics of all ages and have no relation to the changes in the retinal vessels and their consequences, which occasionally complicate the ophthalmoscopic picture. The hemorrhages occur with severe as well as mild diabetes and are at times discovered before it is known that glycosuria is present. To relate the capillary disturbance to the diabetes, one must consider the mild cases in patients with moderate hyperglycemia, with little secondary nutritional changes, and without the enormous carbohydrate depletion of the liver which results in secondary metabolic changes. Such individuals differ in no manner from nondiabetics save in the lessened ability to regulate the blood-sugar level. It is this prolonged, continuous, moderate hyperglycemia which stands in some sort of causal relationship to the condition in the capillaries, with the resulting small hemorrhages. This explanation does not solve the whole question of the pathogenesis of diabetic retinopathy. It cannot be stated how the

hyperglycemia produces the retinal capillary peristasis, nor why the hemorrhages are not found in every case of diabetes. Although the large and massive hemorrhages that rupture into the vitreous can be assumed to be due to an aggravated form of prestasis, it is not known why this aggravated form occurs in only a limited number of cases of diabetic retinitis. The newly formed vessels that are found in some cases may possibly be explained by slowing of the circulation in a large number of capillaries at one time and in one area which supplies the stimulus for their formation.

There are no known means of preventing the occurrence of the retinal hemorrhages nor of causing their disappearance once they have occurred. Possibly control of the blood sugar at the normal level of 80-90 or even 100 mg. per cubic centimeter prevents the hemorrhages, but it is not possible to achieve this, and most physicians are quite satisfied when they can keep the blood sugar at about 130-150, which, however, is still a mild hyperglycemia and just the condition responsible for the capillary peristasis and the resulting retinal hemorrhages.

Eye complications in diabetes from the standpoint of the internist

Dr. Albert A. Epstein said that the incidence of complications in diabetes mellitus is not related to the severity of the disease. Complications occur less frequently in juvenile diabetics than in older patients, although the disease is often more severe in the former. The ocular complications are among the most feared, and retinopathy and cataract give the greatest concern.

There are two views as to the cause of the complications. They may be, specifically, a result of the diabetes, or they may be secondary to antecedent degenerative vascular changes. If they are due to the diabetes directly, proper control of the diabetes would be expected to prevent their occurrence. In the adequately treated juvenile diabetic, these complications should never develop. O'Brien and Allen found that these ocular changes cleared up with adequate control. Waite and Beetham found that the extension of the life of young diabetic patients permits the ultimate development of vascular sclerosis.

The evolution of the diabetic picture seems to be related to prenatal or hereditary influences; their occurrence in several members of the same family shows their genetic background. Proper control of the diabetes may limit their progression, whereas poor control may speed the maturation of the complications. There is a hereditary taint in every incident befalling the diabetic patient. The usual complications following the administration of insulin are, however, due to hydration; the sugar level of the blood falls rapidly, while that of the vitreous lags; the result is changes in osmotic pressure and in the refraction. The tendency to postoperative bleeding after the use of insulin preoperatively is due to alteration in the blood volume and calls for the judicious use of insulin prior to surgery. It may be that the elevation of the blood sugar is a physiologic adaptation to bring about its utilization; consequently, the lowering of the blood-sugar level by insulin requires care in its use.

The occurrence of local reactions at the region of injection of insulin—tumefaction and atrophy—suggests the possibility that similar toxic changes might take place in susceptible eyes despite their remoteness from the point of injection, as a result of long-continued use of the insulin.

Surgical eye complications in diabetes

Dr. Sigmund A. Agatston listed cataract, glaucoma, strabismus, and detach-

ment of the retina as the chief surgical conditions encountered in these patients.

The real gray diabetic cataract is seen only in younger patients. In patients past 60 years of age, the cataract differs in no way from the usual senile cataract and most commonly is nuclear, with some cortical opacities. Indications for surgery are the same as in the ordinary senile cataract. If visibility of the retina is fair or good and vision is disproportionately poor, pathologic change in the fundus or optic nerve, rather than the condition of the lens, is responsible for the loss, and operation is contraindicated. Loss of vision may be caused by iritis, retrobulbar neuritis, advanced diabetic retinitis, hemorrhage into the vitreous, thrombosis of the retinal vein, and detachment of the retina. These pathologic changes may be seen if the lens is transparent, but must be inferred mainly through light projection and visual field when ophthalmoscopy is impossible. The condition of the retina of the other eye is a more important guide than is the blood-sugar determination. Petechial or small retinal hemorrhages and retinal veins of normal character indicate a good surgical risk; whereas engorged veins and large hemorrhages indicate the opposite, and surgery should be delayed or avoided. Operation should be refused in the presence of hemorrhage in the vitreous, retinitis proliferans, or detachment of the retina.

The most frequent postoperative complications are recurrent hemorrhage into the anterior chamber, hemorrhage into the vitreous, detachment of the choroid, thrombosis of the retinal vein, secondary glaucoma, and expulsive hemorrhage.

Primary glaucoma—chronic, simple, or acute—occurs in diabetic subjects, with normal frequency. Surgery may be uncomplicated. Results are influenced by the condition of the retinal and uveal venous systems, as in cataract surgery. During an attack of acute glaucoma, the iris sometimes takes on the appearance of rubeosis, but unless the retinal veins are affected, the operative result is good, frequently even without excessive hemorrhage into the anterior chamber.

Cutting operations to relieve secondary glaucoma following thrombosis of the retinal vein are doomed to failure, necessitating ultimate enucleation. Cyclodiathermy has given relief without enucleation and, aided by a simultaneous paracentesis, has yielded fairly satisfactory results, even with return of light perception. For acute glaucoma occurring with rubeosis of the iris and hemorrhages into the vitreous, only paracentesis through the cornea should be attempted; even this may result in hemorrhage into the anterior chamber, and the prognosis is bad.

While successful intraocular surgery in the presence of a fairly healthy retina is possible with a blood-sugar level even as high as 300 mg. percent, it is best to reduce it by diet or insulin to 200 or less before operating, although it is better not to use insulin on the day of operation.

Squint in diabetic patients is based upon paralysis of the 3d, 4th, or 6th nerve. This generally results in spontaneous recovery after a few weeks to three months, and surgery is not required. Nuclear paralysis of individual muscles does occur, sometimes without recovery. These are probably vascular in origin, but neoplasm, syphilis, and encephalitis must be ruled out.

Ordinary retinal detachment does not occur in diabetics with increased frequency. Secondary detachments, which are frequently found in cases of advanced diabetic retinopathy with retinitis proliferans, are inoperable.

Discussion. Dr. Edward Tolstoi has also noted that eye changes are much more frequent in adults. He has not seen them in children, although he looks for them. In the younger diabetic, he has noted occasional pinpoint hemorrhages,

particularly if the patient is malnourished, and recalls that in the pre-insulin era this lesion was more frequent in children. Their disappearance or relative infrequence now may possibly be attributed to better nutrition rather than to mechanical factors as presented by Dr. Elwyn. There does not appear to be any definite relationship between hyperglycemia and the occurrence of these hemorrhages. A considerable group of diabetics in the second and third decades who had glycosuria and consequently hyperglycemia over a period of years, but who have been free of symptoms of diabetes and have been well nourished, did not reveal the hemorrhages that have been mentioned by Dr. Elwyn as the possible results of hyperglycemia *per se*. Dr. Tolstoi has the impression that so-called diabetic retinitis in the older-age groups represents a resultant of two factors: malnutrition and vascular disease; in the younger patient, malnutrition alone is responsible. When alloxan is injected into animals, the symptoms and signs produced are comparable to diabetes mellitus. Retinal hemorrhages occurred more frequently in those animals given a low-protein diet prior to the production of diabetes. This may be a clue to the nutritive factor.

The preoperative preparation of these patients must be individualized, and one cannot be dogmatic about saying which patients should have insulin.

It is true, as Dr. Epstein pointed out, that there are areas of atrophy where insulin is injected; there are also areas of atrophy near the site of injection. Dr. Epstein's hypothesis that the eye lesions may reflect insulin sensitivity is interesting but requires more supporting evidence.

Dr. A. A. Epstein stated that attempts to normalize the blood sugar in long-standing diabetes by means of insulin are frequently accompanied by untoward developments which occasionally may be very serious. To support the view that the occurrence of diabetes in more than one member of a family is presumptive evidence of a regressive hereditary taint, even though direct heredity cannot be established, a patient with total diabetes of 27 years' duration was described. She was one of five sisters, four of whom had diabetes, although neither parent showed any sign of the disease. The patient showed no evidence of arteriosclerosis nor eye complications. Eye and vascular complications are not accidental nor the result of the diabetes, but are concomitant with and have the same genetic origin.

Dr. Isadore Givner stated that he had administered hesperidin to a series of 15 patients with diabetes, as a result of a statement by the late Dr. Gifford, at a meeting of the New York Diabetic Association, that vitamin P might be of value in the proliferating type of diabetic retinopathy. After one year, there was no improvement that could be definitely ascribed to this therapy. On the basis of Dam's work, in which he found that vitamin E lowers the blood-cholesterol level, these patients were given this vitamin, again with no definite improvement in the retinopathy.

Dr. Henry Dolger considers diabetic retinopathy to be not an ophthalmologic problem. The internist sees the lesion long before the visual disturbance warrants the attention of an ophthalmologist. There is no question as to the existence of a characteristic retinal picture specific for diabetes. It is seen most strikingly in young adults in whom hypertension and arterial changes do not confuse the findings. The characteristic retinopathy developed in 10 of a series of 43 children followed for over 10 years by Dr. Dolger and Dr. Fischer. During their first 10 years of observation they were optimistic, but, as the period was extended to 15 years and 20 percent of the patients developed varying degrees of inexorable

retinal damage, the optimism was no longer justified. The sequence of events often is: (1) an occasional, small, round hemorrhage is noted near the macula; and (2) with the passage of time, evidence of vascular involvement elsewhere becomes manifest; as, for example, mild progressive hypertension, increasing albuminuria, and X-ray evidence of arterial calcification in the extremities. The eye lesion is apparently the earliest manifestation of some diffuse vascular process; it is not an isolated finding, but is part of the peculiar vascular change in certain types of diabetes. The cholesterol is not significantly altered in these cases. The control of the diabetes and level of the blood sugar are equally irrelevant to the production of the lesion. It is an archaic concept to consider diabetes a simple disturbance of carbohydrate metabolism. Protein and fat metabolism are equally involved in the basic derangement.

Diabetic retinopathy is the most disturbing complication because it occurs in relatively young people and proceeds relentlessly to blindness despite any type of therapeutic approach. The overoptimism often expressed in the literature with regard to juvenile diabetes is dismaying. A report on 73 children having diabetes who were followed for 20 years was concluded with the optimistic claim that the juvenile diabetic can look forward to a normal life and relatively good health. Yet in this report it was almost casually and without anxiety mentioned that retinopathy was found in at least one quarter of the group. The 22 years since the discovery of insulin, and the excellent results of modern diabetic therapy with regard to prolonging life and improving nutrition and resistance, have not witnessed any significant reduction in the inevitable premature arteriosclerosis which continues to frustrate one's efforts.

Leon H. Ehrlich,
Secretary.

COLLEGE OF PHYSICIANS OF PHILADELPHIA

Section on Ophthalmology

March 15, 1945

Dr. Warren S. Reese, *chairman*

Traumatic iridodialysis: Its surgical correction

Dr. A. Barlow *and* Dr. Herman L. Weiner (by invitation) stated that a direct blow on the eye will sometimes cause a detachment of the root of the iris from its ciliary insertion—traumatic iridodialysis. A small separation is of no concern from either a visual or a cosmetic viewpoint. Frequent instillations of atropine and protection from light by dark glasses or bandage may result in a reattachment, according to some authors. However, when the separation is large, there may be monocular diplopia due to a double pupil. Of graver concern in some cases is the unsightly cosmetic effect produced by the the distortion of the normal contour of the iris and pupil.

A six-year-old girl was struck in the left eye with a BB shot. She was admitted to the Mt. Sinai Hospital on April 28, 1943, soon after the accident. The eye was intensely injected, and the anterior chamber was filled with blood. The temporal base of the iris from the 1- to the 6-o'clock position was torn away from its ciliary attachment, which formed a large separation about 5 mm. wide in the horizontal meridian. The pupil was distorted and drawn nasally and up. The fundus could not be seen owing to the hemorrhage in the anterior chamber. The treatment consisted of atropine, antiseptic collyrium, and sterile dressings. As the hyphemia gradually cleared, a fairly good view of the fundus could be obtained through the pupil, but not through the dialysis. Apparently, the rupture had caused a separation of the iris stroma from its underlying pigment layer. The pigment layer

thus prevented a view of the fundus through the dialysis. Later the lens became opaque; a traumatic cataract was the result.

The following operation with its gratifying outcome was devised by P. C. Jameson, and is described by Wiener and Alvis in "Surgery of the eye." The technique, which was closely adhered to, was described as follows:

A small, curved-eye needle threaded with fine silk (6-0) was introduced in the sclera 2 or 3 mm. behind the limbus above the horizontal line, passed into the anterior chamber, under the base of torn iris, and out through the cornea. The needle was then removed. A similar suture was passed below the horizontal line. An incision was made in the limbus with a narrow keratome between the points of entrance of the two needles in the sclera. Through this opening a small, blunt iris hook was introduced; the hook engaged the thread between the iris and cornea, pulling the end of the thread out of the cornea, back into the anterior chamber, and through the wound out of the eye. The threads were then tied, so that the torn base of the iris was gently brought back to the sclerocorneal junction.

This operation was performed on October 10, 1943, about six months after the injury. Atropine was instilled, and the eye bandaged. The postoperative course was uneventful. The eye was redressed on the second day, and atropine instilled daily thereafter. The sutures were removed on the eighth day, and the child was discharged two days later. On January 13, 1944, the traumatic cataract was removed by a discission, and again by a capsulotomy on June 29, 1944. The result was a clear, fairly round pupil. An approximate correction with +12.00D. sph. gave 20/70 vision.

Comment. Reports in the literature on the surgical treatment of traumatic iridodialysis are not numerous. Most of the operators have used the method of iris incarceration, either by pulling the base of the iris into the limbal incision, or by suturing with one or more sutures a few of the iris fibers to the scleral junction immediately behind the cornea. Ben Witt Key, in 1934, reported four eyes successfully operated on by the suture method; and Goldfeder, in 1932, reported two cases treated by the method of iris incarceration. Spaeth described a similar operation, also based on the principle of iris incarceration by sutures, which he prefers to perform under a conjunctival flap to prevent infection. Wheeler looks with disfavor on the method of iris incarceration which "drags the iris into the limbus wound in such a way as to form an iris prolapse." Neither does he approve of sutures, on the general ground that, "sutures should not be passed through eye structures unnecessarily." He maintains that "an attachment can be easily and permanently secured by simply carrying a tiny shred of tissue from the torn edge of the iris very slightly into the limbus wound." The Jameson operation does not incarcerate the iris between the lips of the wound, but brings the torn surface in contact with a freshened surface, within the anterior chamber. Reattachment takes place by agglutination through a plastic exudate thrown out from the iris at the point of contact.

Since they had had no previous experience with the surgical treatment of traumatic iridodialysis, they do not presume to judge the merits of this or other methods. In this particular case, they were fortunate in obtaining the desired result with the method described. When the patient was last seen, two weeks previously, about 18 months after the operation, there were no signs nor symptoms of any late complications, and the iris was still intact. The right eye remained normal throughout.

In conclusion they stated that they were

keenly conscious of the fact that this operation, like any other intraocular operation, was not without its potential risks, and should not be undertaken lightly. The operation should not be performed when the dialysis is small, or when the defect is concealed by the lids. But when the defect is large, and the cosmetic effect is such that it can be a source of real embarrassment, the operation is justified.

Dr. Barlow said that one of the possible dangers would be injuring the lens during the operation, thus producing a traumatic cataract. In this case, of course, the lens was already opaque, and this possibility was not faced. However, when the lens is clear, great care must be exercised not to injure it.

Another possible danger is infection. This, of course, is something which is feared in every intraocular operation. However, if the operation is done under aseptic conditions, and the culture is negative, the danger of infection should be no greater than in any other operation—cataract extraction for example—especially in view of the variety of sutures so popular in modern cataract surgery.

Another possible danger which should be mentioned is late secondary glaucoma. This is a possibility both after the traumatic iridodialysis and after the operation for its correction. However, as far as he knew, Dr. Barlow said that no such case of secondary glaucoma following the surgical correction of traumatic iridodialysis has ever been reported.

Discussion. Dr. Warren S. Reese said that before Dr. Barlow explained about the keratome incision, it occurred to him that it might be possible to avoid a keratome incision by using a self-threading needle, and two sutures, one of which would be passed between the two strands of the first just beyond its exit from the iris. The needles could be removed following the perforation of the cornea. The suture could then be pulled back into the anterior chamber, one acting as a plug and preventing the other from slipping back through the iris.

Dr. James S. Shipman stated that in reading the technique of this operation, which is so well described and illustrated in "Surgery of the eye," he could not understand why the cornea would not be badly scarred in cases of iridodialysis sufficiently large to justify this operation.

In any iridodialysis that is large enough to justify this operation, it would be necessary to bring the needles out through the cornea fairly close to the center, and since these go all the way through the cornea, he does not see how permanent scarring with an accompanying reduction in vision can be prevented. Certainly, infection is also a danger, since the needles and sutures go out through the cornea, and the free suture has to be again pulled back into the anterior chamber. Extreme care should be taken to prevent contamination of this suture by the lashes, skin of the lids, and skin of the face. His experience with suturing the cornea has been that one is more likely to get some sloughing, with infection about the sutures, than when suturing is done through the sclera.

Regarding the conjunctival flap, he said he does not feel that this is necessary because it is likely to dam up the secretions and give rise to more sloughing about the sutures. He stated that this operation is a very ingenious one, and one which on several occasions he had been tempted to try but had refrained for fear of the damage which it might do to the cornea. It has been pointed out by Dr. Wiener that small iridodialyses do not cause sufficient trouble to warrant the dangers of this operation, and the very extensive ones certainly bring up the question of corneal scarring. He asked Dr. Weiner to relate just what the final amount of scarring in the cornea was.

Dr. Herman L. Weiner, in closing, an-

swered that they were quite aware of the fact that the cornea must have scars following an operation of this type. A rather fine round needle was used with no. 6-0 silk. The resulting scars were pin-point and could be seen only under bright illumination and slitlamp examination. Vision was not impaired by the scars.

Reëvaluation of the Herbert flap operation for glaucoma

Dr. Louis Lehrfeld stated that Lt. Col. H. Herbert of the Indian Medical Service contributed many splendid articles on the surgical treatment of glaucoma from 1903 to 1934.

Of the many types of operations suggested by Herbert, the flap operation, sometimes known as the trapdoor operation, is revised by the author for cases of absolute glaucoma. Seven cases were reported, two of which were especially related in detail because of the splendid results in reducing the intraocular pressure.

Herbert's original operation is described as an anterior sclerotomy in which the horizontal incision is made in the sclera at varying distances from 1.5 to 3 mm. above the limbus. Two vertical incisions are made, one at each end of the horizontal incision toward the cornea; the effect is of an inverted U-shaped trapdoor covered by the overlying conjunctiva.

The modification suggested by the author is in the location of the trapdoor—namely, in the position of the pars plana of the ciliary body, which he describes as the silent area of the eyeball. The location has the advantage that it is sufficiently distant from the lens and from the corneoscleral junction, where surgery in itself leads to many complications and unsuccessful results.

He recommended a modified Herbert trapdoor operation for the acute and chronic forms of glaucoma. The following reasons were offered: (1) the simplicity of the technique; (2) the lack of complications; (3) its effectiveness in reducing the intraocular pressure gradually; and (4) because it is located in the vitreous segment of the globe, remote from the canal of Schlemm, the iris, the lens, the root of the iris, and corneoscleral junction which in most instances have already been damaged by increased intraocular pressure.

A number of lantern slides were exhibited illustrating the Herbert operation, and the new point of approach suggested by Dr. Lehrfeld.

Symmetrical defects in the lower lids associated with abnormalities of the zygomatic processes of the temporal bone

Dr. Irving H. Leopold, Dr. Francis Mahoney (by invitation), and Mabel Lee Price, M.S. (by invitation) stated that symmetrical defects in the lower lids associated with bilateral absence of the zygomatic processes were reported in a child, in the child's mother, and in the mother's father. A pedigree was traced for this family which suggested the hereditary nature of these defects, and that the responsible gene is a dominant one. X-ray studies established the fact that the deficiency of the zygomatic process is associated with the lower-lid deformity and, in addition, demonstrate that the osseous deficiency is similarly transmitted. The presence of normal facial bones other than the zygomatic process of the temporal bones, and normal clavicles would exclude these cases from the cleidocranial-dysostosis group.

Although the lid defects in the three cases presented are very similar to those observed by others, the bony defects are chiefly of the zygomatic processes of the temporal bones, and not of the zygoma

bones, as has been described in the earlier reports of others. None of the previous reports noted an associated osseous deficiency in other members of the respective families.

Dr. Francis Mahoney mentioned that there are numerous types and groups of dysostoses of the cranial bones. The commonest are the meningocele and encephalocele, and less common are those cases with a congenital absence of the superior orbital wall. In these cases there is a characteristic pulsation of the globe synchronous with cardiac pulsations. The least common is the "Lückenschädel" or lace-work skull. This is the most severe and extensive of the dysostoses of the skull. None of these are hereditary in nature.

There have been three types reported with a hereditary link. This group of cases is a fourth type in this series.

The most spectacular of these, of course, is hereditary cleidocranial dysostosis, where there are associated cranial defects in individuals with deficient or absent clavicles. Some of these people can bend forward, and touch their two shoulders together. They have, as Dr. Leopold described, changes in the facial bones, but these changes are in the maxillae, with deficiencies in the maxillary teeth and malocclusion with the mandibular teeth.

Another type is hereditary craniofacial dysostosis. This appears to be a group in which the skull and facial-bone changes are very similar to those presented in cleidocranial dysostosis but the changes in the clavicles are absent.

The third group, which seems closest related to this group, comprises the hereditary ectodermal dysplasias. In these cases there is a deficiency in the sweat glands and scanty or missing hair. Usually the upper incisor teeth are missing. The skull has a hydrocephalic appearance with a "too large head upon a too small face."

In this group of cases the cranial bones were well formed. There was no disproportion between the bones of the vault and the bones of the face. There was no deficiency or malocclusion of the teeth. The clavicles were normal. The only bony deficiency was the absence of the zygomatic processes of the temporal bones. However, the changes in the lower eyelashes, and in the glands around them would point to some link with the hereditary ectodermal dysplasias.

Intravitreal penetration of penicillin and penicillin therapy of infections of the vitreous

Dr. Irving H. Leopold stated that experimental studies with rabbits revealed that intramuscularly and intravenously administered penicillin in a concentration of 4,000 units per kilogram failed to produce detectable concentrations of penicillin.

Prolonging the length of time that penicillin remained in the blood stream by employing a penicillin-gelatin-vasoconstrictor preparation failed to increase the intravitreous penetration of penicillin from the blood stream in the normal rabbit eye.

Subconjunctival injection of penicillin and injection of the substance into the anterior chamber produced detectable concentrations of penicillin in the vitreous in the normal rabbit eye.

All methods of administration produced higher concentrations of penicillin in the vitreous humor in the rabbit eyes with infection of the anterior chamber than in normal eyes.

Theoretically adequate concentrations of penicillin in the vitreous were obtained with administration of penicillin by subconjunctival injection and by injection into the anterior chamber in the inflamed

rabbit eye. Such levels were adequately maintained for three hours after one injection.

Higher concentrations of penicillin in the vitreous were obtained in eyes with iridectomies than in normal eyes after injections of penicillin into the anterior chamber.

Penicillin intravenously administered failed to stop the progression of experimentally induced ectogenous infections of a vitreous caused by a penicillin-sensitive strain of Staphylococcus aureus.

Repeated conjunctival injections of penicillin and injections into the anterior chamber halted the progress of intravitreal infection due to Staphylococcus aureus in 4 of 10 rabbit eyes.

Intravitreal injections halted the progress of ectogenous infections of the vitreous due to Staphylococcus aureus in all eyes receiving one injection consisting of more than 500 Oxford units of penicillin. Lower concentrations than this, including five units per injection, were partially successful.

Discussion. Dr. W. Zentmayer said that Rycroft quite recently reported the results obtained with penicillin by the ophthalmologists in British North Africa and Central Mediterranean Forces. The study is largely clinical, and this may explain the apparent disagreement between their results and those given here by Dr. Leopold. From their findings penicillin does not enter the ocular media when given by intramuscular injection. Such injections do not influence the course of deep infections of the eye. The eye will tolerate large concentrations of penicillin injected into the media, but such concentrations do not control deep infections.

Dr. H. Maxwell Langdon said that the organism with which these experiments were done was selected especially for its nonresistant powers to penicillin. It would be interesting to know the effect on other organisms in the vitreous. Those resistant to penicillin, of course, have been fairly well recognized and classified, but, as he understands it, some are more readily affected than others. Without cultures, of course, these could not be identified; so it is bound to be more of a trial-and-error procedure in the ordinary clinical case. It is a valuable piece of work, and possibly may result in the saving of eyes which otherwise might be given up as hopeless.

Dr. Irving Leopold, in closing, said that he, too, had found Colonel Rycroft's article very discouraging. All of Rycroft's cases of vitreous inflammation were due to intravitreal foreign-body penetration. Only two of these cases showed improvement, and these two were ones in which the offending foreign bodies were removed. In not one did aqueous or vitreous cultures reveal that the exciting, inflammatory agent was a penicillin-sensitive organism.

In all of Rycroft's cases intravitreous penicillin injections were not made until the inflammatory process had become well established. In the experiments on rabbit eyes, therapy was instituted two hours after vitreous inoculation with Staphylococcus aureus. Von Sallmann's studies indicate that little can be expected from direct intravitreal injection of penicillin later than 12 hours after inoculation of the penicillin-sensitive organism, but that excellent results may be obtained by earlier institution of therapy.

Rycroft's studies on human eyes showed, as did the experimentation on rabbit eyes, that intramuscularly administered penicillin did not produce detectable levels in the vitreous of normal eyes. He could not detect penicillin in the vitreous of inflamed human eyes after intramuscular administration; whereas, the vitreous of inflamed rabbit eyes did possess detectable but inadequate concentrations of penicillin.

It is known that the permeability of

rabbit ocular capillaries is greater than that of human capillaries in inflammatory states. For example, Brown and Nantz pointed out that the rabbit's secondary aqueous contains considerable fibrin; whereas, the adult human eye shows very little if any fibrin in its secondary aqueous. This permeability difference must be kept in mind in drawing analogies between the data accumulated by experimental studies on rabbit eyes, and that of human cases.

The Staphylococcus aureus organism was used in these studies because it is extremely sensitive to penicillin. The main purpose of the experiment was to compare the possible chances of controlling the vitreous infections by the various methods of administration. He said he believed that the experimental data have shown that systemic therapy is not adequate. Rycroft's experience would bear this out. The experimental studies indicate that direct intravitreal injections may be effective if one treats the infection early enough. This latter observation can be said to apply only when the vitreous infection is due to a penicillin-sensitive organism.

Dr. Leopold said he agreed with Dr. Langdon that these experiments are only an introduction to the problem of treating vitreous infections, and much more work will have to be done both in the laboratory and clinically before the ideal method of treating vitreous infections with penicillin will be known.

George F. J. Kelly,
Clerk.

BROOKLYN OPHTHALMOLOGICAL SOCIETY

October 18, 1945

Penicillin in ophthalmology (practical viewpoints)

Dr. Ludwig Von Sallmann limited his report to practical suggestions as to the use of penicillin in ophthalmology and distinguished between various types of administration depending upon the site of the infection. Surface infections of the lid border, conjunctiva, and cornea benefit from the use of penicillin in aqueous solutions, ointments, and gelatin discs when the strain of the microörganism is relatively susceptible. Data were presented on dosage, frequency of application, and the advantages of certain ointment bases and penicillin salts. For acute ectogenous infections of the anterior segment of the eye, iontophoresis and the placing of cotton packs in the conjunctival sac secure adequate concentrations of penicillin in the eye, whereas subconjunctival injection does not. Another method of treating infections of the anterior segment would be by replacing the aqueous with a penicillin solution containing 1,000 to 2,000 Oxford units. Gratifying results were observed when the infection had not spread to deeper parts of the lens or to the vitreous space.

Infections of the lens and vitreous can be attacked by direct injection of penicillin in a concentration that does not cause damage. Encouraging clinical results are at hand in cases in which the infection was not older than 48 hours. In more advanced infections the inflammation may subside but the function will not be restored. Systemic therapy can be used as an adjuvant in ectogenous infections but is of significant value in metastatic infections.

Diseases of the macula

Dr. Ralph I. Lloyd surveyed this subject, demonstrating with kodachrome slides the condition of the fundus in his comprehensive talk. He emphasized especially the differentiation between hereditary and acquired disease of the macula and discussed at some length the subject of eclipse blindness.

George A. Graham,
Associate secretary-treasurer.

OPHTHALMOLOGICAL SOCIETY OF MADRID

December 21, 1945

DR. MARÍN AMAT, *president*
SCIENTIFIC SESSION

CHOLINE IN SERPIGINOUS ULCERS OF THE CORNEA

DR. ENRIQUE MARÍN ENCISO used choline in his clinics at the Provincial Hospital of Ciudad-Real, based on the article of Drs. T. J. Dimitry and P. Aznar, entitled "The use of choline in cases of ulcer and leukoma of the cornea" published in the American Journal of Ophthalmology, for January, 1945, and gave an account of its favorable results in his doctor's thesis, which was read last October.

Dr. Marín Enciso confirms all findings in his doctor's thesis, and adds eight clinical histories of patients with serpiginous ulcer of the cornea, in which a 1-percent solution of choline, injected several times a day, produced a rapid cure with a minimum of scar tissue.

He called attention to the use of choline with mercurochrome which acts well in combination. He has used a 1-percent solution of choline with good results in subconjunctival injections as well as in the conjunctival sac. Dr. Marín Enciso stated that it was unnecessary to remove the tear sac in any of his patients or perform other types of dacryocysto-rhinostomy. Had these operations been performed, success would have been still greater in that the condition would have improved more quickly.

CHOLINE IN OPHTHALMOLOGY

Dr. Marín Amat, impressed by the work of Drs. Dimitry and Aznar, had also used choline in a 1-percent solution in many cases of serpiginous ulcer of the cornea, and obtained wonderful results. Dr. Marín Amat used choline and mercurochrome in combination, having noted that choline, which has a tremendous penetrating power on the tissues, so enhances the action of mercurochrome that the bactericidal effect is increased. He also used choline in cases of incipient panophthalmitis, in purulent iritis, in infection of the filtering tissues following Elliot corneoscleral trephining, and in the posttraumatic suppurations of the eyeball.

Dr. Marín Amat has also used a solution of choline in cases of leukoma of the cornea caused by lymphatic ulcers, for corneal bullae, and for serpiginous ulcers of the cornea, and he reported four clinical histories showing good results.

Dr. Marín Amat has had no experience with choline in old cases of leukoma because of the brief period of use. However, judging from the statements of the American doctors, and by what he has verified in recent cases, he believes it to be of great help. He has likewise used choline in the infiltration of cholesterin in the cornea, having had better results than he had obtained with all other general as well as local treatments.

He was equally impressed by an article by Drs. Dimitry and Lombardo, "The lipotropic effect of choline in retinal tuberculosis," which was published in the American Journal of Ophthalmology for August, 1945. This article referred to a case of hemorrhages and tubercles in the retina, which in the space of two weeks, under the administration of 25 centigrams of choline, three times daily, disappeared completely. Dr. Marin Amat used choline in two cases of relapsing hemorrhages of the vitreous. Improvement resulted in one case, but the result in the other case was not known, as the patient did not return.

Since chlorhydrated choline is extremely deliquescent, it must be used in a water-diluted solution of proper dosages. The

best treatment is 20 drops (taken 15 minutes before each meal) of chlorhydrated choline—5 grams in 20 grams of distilled or redistilled water. Dr. Marín Amat has used 1 c.c. of choline repeatedly, subconjunctivally, in a solution of 1:300, with satisfactory results. The injection is entirely painless.

Can glaucoma be an occasional cause of death?

Prof. B. Carreras Duran reported two cases in which glaucoma caused death. The first, an acute case of glaucoma, accompanied by vomiting, occurred in the consultation room of the physician. The patient, through the strain of vomiting, had died of an apoplectic attack. In the second case, of a patient with staphyloma, a hemorrhage occurred which persisted in spite of all medical and surgical means employed to stop it, causing the patient's death.

Bilateral luxated lenses

Dr. Bartolozzi presented a woman who belonged to the service of Professor Carreras of the Madrid Faculty of Medicine. Both crystalline lenses were luxated into the posterior chamber coincident with lesions of the base of the eye of the heredoluetic type. The etiology had not been established. It was still being studied.

Apropos of this case, Drs. Marín Amat and García Miranda told of analogous observations made by them.

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DR. W. H. CRISP
AN APPRECIATION

Dr. William H. Crisp's editorial in the January issue, announcing his retirement as editor of the abstract department, should not go unnoticed. Only those of us who have been in close association with Dr. Crisp in Denver and those actively engaged in the publishing of the Journal have any conception of the effort that he has expended. But anyone may look through the ophthalmic literature and note the hundreds of original papers, brilliant editorials, and abstracts that he has written and the thousands of abstracts and original papers that he has edited. The abstract department under Dr. Crisp's guidance has not only given the reader a rapid survey of the important ophthalmic literature, but has lightened the task of searching through the literature for knowledge on a particular subject. Only the combination of a brilliant mind, a desire for perfection, and a disregard for financial considerations could permit such a public-spirited accomplishment. Dr. Crisp's ability to read many languages has been a vital aid in the accuracy and completeness of the abstract department.

Dr. Crisp speaks of the "evening of life," but those of us closely associated

with him notice no evening of mental vigor and enthusiasm. We wish him many years of successful practice and are happy that he now has more time to direct his activities to the artistic endeavors in which he has perfected himself. We, of the Colorado Ophthalmological Society, wish publicly to express gratitude to a colleague "who worked that we might know and that patients might profit."

Members of the Colorado
Ophthalmological Society

A NATIONAL PROGRAM FOR TRAINING IN OPHTHALMOLOGY

Quite admirably, the emphasis of this Journal's editorial comments in recent months has been upon postwar training in ophthalmology. There is common agreement as to the urgency of the problem, but the conclusions as to how much may be accomplished are scarcely optimistic.

World War II has intensified a problem which existed before the war. In this, as in other fields, it has accumulated demand and diminished supply. The country as a whole has never had an adequate and unified program of training in ophthalmology. Perhaps the war will make it possible for us to accomplish something which we have not achieved before.

A worthy effort is that of Harvard University to provide, for a maximum of thirty postgraduate students, a two-months course in fundamentals (much of which Lancaster reminds us can be taught by lectures, reading, and quizzes) followed by a clinical course of one month. These short programs should be stimulating to young ophthalmologists whose time was badly wasted during the war and who are eagerly looking for refresher courses. By themselves, the two Harvard courses cannot, it is obvious, create first-class ophthalmologists.

Vail reminds us that of fifty-nine class-A medical schools not more than six are giving or are planning to give basic courses in ophthalmology. Some schools are offering courses of six or nine months. Lancaster frankly quotes the American Board of Ophthalmology as consistently urging that "short courses are an abomination—unsound pedagogically and productive of a poor grade of practitioner."

Yet short courses, rightly planned, can teach a great deal. The student who gets least out of a short course is he who has done little or no systematic reading before beginning the course. The student who has read systematically, deliberately, and intelligently may absorb much in a short time, and it is doubtful whether any student should be allowed to follow a clinic without being able to show that he has previously pursued such a thorough course of reading. This is especially true with regard to refraction, which is the economic basis of a beginning practice in ophthalmology, but which is perhaps less systematically approached by the average student than any other part of the subject.

More than ever before, governments are now disposed to coöperate in the provision of education for various professions. It is obvious that the most successful utilization of this governmental tendency is likely to occur under adequate guidance and pressure from within the group of educators in ophthalmology. In spite of the general dislike for governmental interference in the field of medicine, it is probable that any relatively adequate scheme will have to depend in large measure upon government financing. It is worth the nation's while to contribute to institutional and individual financial need in pushing the educational program in ophthalmology.

So far as clinical facilities are concerned, we may have to meet the emergency by accepting less of thoroughness

than we might have demanded before the war, or than we shall demand when the emergency is past. Many intending ophthalmologists will continue to pick up their knowledge rather casually, through assistantships or through courses by commercial clinics.

Perhaps we are attempting for a few an excess of thoroughness as compared with the magnitude of the problem as a whole. Mann makes the interesting remark that "on one side of the Atlantic the aim is the very thorough and complete training of a relatively few high-grade specialists, while on the other side we aim at basic instruction of a larger number for a shorter time, leaving it to the initiative of the few to obtain for themselves the final gloss and polish of academic distinction requisite for the highest grade."

In the presence of a really national problem, it seems essential to formulate a national program, partly through conference between educators and partly through coördination between educators on the one hand and departments of the national government on the other. Such a program might well represent compromise between conflicting views as to the scope of education in ophthalmology, so that an approximately uniform curriculum might be applied to different sections of the country. Or certain parts of the program might be presented in some educational centers, to be supplemented by other parts of the program in other centers. A program that is national and coördinated, rather than local and spotty, appears called for by the necessities of the situation.

A need not altogether easy to supply is that of an adequate staff of teachers. For one thing, most medical educators who are also private practitioners can do a much more thorough job away from home than in their own communities, because it is hard to escape the importunities of patients in the home area. Yet it should be possible to create, all over the country, a staff of teachers who could afford to leave home practice for national service in ophthalmic education, perhaps several times each year. The greatest sphere of usefulness of the veteran teacher and clinician lies in handing on to another generation the results of his own study and experience.

It is to be hoped that effect may be given to Vail's frank and practical suggestion that combined residencies in ophthalmology and otolaryngology be divided into two parts, one devoted to each specialty, for experience has shown that, at least as regards ophthalmology, the educational result suffers from the combination.

W. H. Crisp.

TRIDIONE AND THE EYE

There has recently appeared in the field of therapeutics a new synthetic compound, Tridione (3, 5, 5-Trimethyloxazolidine-2, 4-dione, Abbott). This drug is being used as an anticonvulsant in the treatment of epilepsy, particularly for its inhibiting effect on *petit mal,* and on myoclonic and akinetic seizures in epilepsy, and is being prescribed for other forms of psychomotor attacks, such as the spasmodic tremors and tics of parkinsonism. The results are promising.

One of the unpleasant and disturbing side effects of Tridione therapy is the so-called "glare phenomenon" complained of by patients taking the drug in from moderate to large doses. This phenomenon is described by patients in various ways, from inability to see black on white, or colors against a light background, to complete day blindness. The symptoms disappear when the drug is stopped, but there is a time lag, probably depending on the duration of the use of the drug, which would indicate that there was some

accumulative effect. For example, one patient recently studied did not recover from the "glare phenomenon" for two weeks after the drug was discontinued.

The ophthalmic examination of these patients is an interesting experience. The phenomenon is a puzzling one that requires further investigation. Vision is normal when tested with an unlighted chart but decreases to an average of 20/100 when the chart is illuminated. On putting on dark glasses, the patient can read the letters on the chart easily, as a rule. The fields of vision, both peripheral and central, have been found to be unaffected, and the ophthalmoscopic examination reveals no detectable disorder in the ocular fundus. The color vision when tested with the Ishihara test is likewise undisturbed.

Curiously enough, the reading vision is not particularly affected, at least in the few patients recently studied, although each patient preferred to read through tinted lenses.

The group studied were willing to put up with the "glare phenomenon" because they felt better under this treatment than otherwise, and were not too uncomfortable when they wore their dark glasses and avoided bright sunlight.

It is interesting to speculate just what goes on in the eyes to produce this symptom. There is apparently no damage to the visual system—at least none that can be demonstrated. Caution is needed, however; whether or not serious harm can arise from the administration of the drug has not yet been determined. The use of large doses of vitamin A has had no influence on the symptom, nor has any other treatment, so far as is known, had any effect. Histologic studies on the optic nerves and retinas of experimental animals receiving large doses of Tridione over long periods of time have failed to reveal any evidence of damage. But it would be wise to limit the use of the drug to those patients who show no optic-nerve disease, or who are not taking concurrently a drug that may injure the optic nerve.

This editorial is written for the purpose of drawing the attention of the ophthalmologist to this new therapeutic agent that may not be entirely innocuous to sight, and as a plea for further studies, both chemical and experimental, to determine, first, how the "glare phenomenon" is induced; secondly, what, if anything, can be done to counteract it; and, finally, if thereby any residual permanent damage is produced in the visual system. This last is most important. It would be wise, therefore, for each ophthalmologist to acquaint himself with Tridione and to be alert to discover the answers to these important questions.

Derrick Vail.

CORRESPONDENCE

Dispensing with bifocals

Editor,
American Journal of Ophthalmology:

The communication of Dr. L. J. Alger in the February issue of the American Journal of Ophthalmology is a timely reminder of what may sometimes be done to avoid bifocals, especially for those who find the adjustment to bifocals inordinately difficult. The method is also applicable for presbyoptic patients other than those having alternating strabismus. Although not frequently described, this method has been used occasionally by many doctors. It is really a procedure akin to that sometimes used by anisometropic patients who all their lives have relied on one eye for sharp vision at distance and the other eye for sharp vision at near.

The first such case was brought forc-

ibly to my attention some 30 odd years ago when a doctor described a patient who came to his office. An elderly gentleman brought a little granddaughter for an eye examination as directed by the school nurse. The doctor took the patient's vision and found it markedly subnormal. A flash with the retinoscope showed the child to be myopic, and the doctor told the grandfather who had accompanied the child to the examination room, that she would have to wear glasses. The old gentleman was rather put out by this information and remarked that something must be wrong with the new generation because he could read the smallest letters on the chart without any glasses, as, in fact, he could. The doctor then confidently remarked that to offset this, the little girl could read at near without glasses which the old gentleman could not do. Whereupon the old gentleman said the doctor was all wrong, for he could read the finest print at near without glasses.

A check up by the doctor on the old gentleman's eyes disclosed what the reader may have already surmised; namely, that the man had one eye practically emmetropic and the other eye about 2.50D. myopic. Without knowing it, and without loss of binocular fixation, the old gentleman was using the emmetropic eye for keen distance vision and the myopic eye for keen near vision. There was no strabismus, both eyes were fixating, but one eye took the lead for distance vision, and the other took the lead for near vision.

Such a condition, in which both eyes fixate, and only one eye focuses, does not seem to disturb vision as much as one would expect. I can speak from personal experience because my own eyes are anisometropic in a similar way. When fixating with both eyes, the nonfocusing eye does impair the vision of the focusing eye to some extent, but many a patient would rather bear this than wear bifocals. For in anisometropia especially, bifocals bring in disturbances to which the patient finds it harder to adjust himself.

Of the several difficulties encountered by bifocal wearers, I think the limitation of the field for both far and near looms large—sometimes subconsciously. Even single-vision lenses, set in a frame or mounting, restrict one's visual field. Anyone who has worn glasses, unless he is extremely myopic or astigmatic, frequently gets a feeling of relief when he removes his glasses. This is largely due to the removal of an obstruction to his visual field.

This field limitation is of course much more marked when bifocals are worn. The use of single-vision lenses set to have one eye focused for distance and the other eye for near gives the patient full binocular-field vision for far and near, with sharp monocular detail vision at both distances. It is a procedure that deserves the ophthalmologist's serious consideration.

(Signed) Joseph I. Pascal,
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New York

ABSTRACT DEPARTMENT

EDITED BY DR. F. HERBERT HAESSLER

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is mentioned only in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, and history
19. Anatomy, embryology, and comparative ophthalmology

3

PHYSIOLOGIC OPTICS, REFRACTION, AND COLOR VISION

Hardy, L. H. **Standard illuminants in relation to color-testing procedures.** Arch. of Ophth., 1945, v. 34, Oct., pp. 278-282.

Tests for defective color vision always involve three factors: the light with which to see, the subject tested, and the materials and procedures of the test. Failure to standardize two of the three factors causes invalid results in evaluating the third factor. Most tests for color vision are carried out under such nonstandard conditions that they test the illumination as much as they test the ability of the subject to distinguish colors.

The author points out the extreme variability in the color value of various illuminants, especially of daylight. Standards set up by the International Commission of Illumination are discussed. I. C. I. illuminant C is the choice for all work in testing color division which involves the use of reflected light and, unless special conditions are indicated, should always be utilized. A close approximation to this illuminant is commercially available at relatively low cost. John C. Long.

Hardy, L. H., Rand, G., and Rittler, M. C. **Tests for detection and analysis of color blindness. 1. An evaluation of the Ishihara test.** Arch. of Ophth., 1945, v. 34, Oct., pp. 295-302.

The color perception of subjects was tested with a battery of different tests designed to detect and classify color blindness. All of the examinations using pigment test material were carried out under a close approximation to I. C. I. illuminant C. The following conclusions concerning the fifth edition of the Ishihara test seem justified: The test affords a good rough device for screening persons with defective red-green vision from persons with normal color vision if a performance score of 60 is taken. No analysis as to type or extent of defect can be based on performance scores. The test yields a lower score for the deuteranopic than for the protanopic type of defective

color vision. It fails to classify the type of defective color vision and cannot be used to give a satisfactory evaluation of either the extent or the degree of the defect. Plate 4 is a practically perfect screening test when properly used.

John C. Long.

Kayser, B. **A chronic gastrointestinal ailment caused by a derangement of ocular functions.** Klin. M. f. Augenh., 1942, v. 108, Sept.-Oct., p. 626.

In a woman 36 years of age, a chronic gastrointestinal ailment had resisted all other forms of therapy, among which were extirpation of the appendix and gallbladder, over a period of 14 years. She was immediately relieved of all symptoms when she was given spectacles which corrected a refractive error and an imbalance of binocular coördination. F. Nelson.

Martin, H. G. **Continuation of the screen test.** Amer. Jour. Ophth., 1946, v. 29, Feb., pp. 196-200.

Ogle, K., and Ellerbrock, V. J. **Stereoscopic sensitivity in the space eikonometer.** Arch. of Ophth., 1945, v. 34, Oct., pp. 303-310.

The space eikonometer has recently been shown to be a suitable instrument for the measurement of aniseikonic errors. This instrument differs from the standard eikonometer in that the measurement depends on binocular perception rather than on a direct comparison of image size. The space eikonometer is so constructed that the apparent orientation of test objects can be perceived only by binocular space perception. If an aniseikonic error exists between the two eyes, these test objects will appear incorrectly oriented to the subject. By means of suitable size lenses the relative size of the images in the two eyes can be changed until the test objects appear correctly oriented. The magnifications introduced to achieve this objective measure the aniseikonic error.

The construction of the instrument is briefly described. Data obtained on subjects are presented and analyzed. The authors conclude that the results of this study of sensitivities emphasize the accuracy of the space eikonometer for the detection and measurement of aniseikonic errors. John C. Long.

Simonson, E., Blankstein, S. S., and Carey, E. J. **Light and dark adaptation.** Amer. Jour. Ophth., 1946, v. 29, March, pp. 328-340. (8 tables, references.)

Slataper, F. J. **Accommodation of presbyopia and its correction.** Arch. of Ophth., 1945, v. 34, Nov.-Dec., pp. 389-397.

The correct addition for near vision in presbyopia depends primarily on the amount of available accommodation and secondarily on the selection of the best fixed distance for near work.

In reporting a tremendous amount of research work on the subject the author's conclusions are that:

1. The correct estimation of the patient's total accommodation is the most important factor in the correction of presbyopia with a glass for near work.

2. It is necessary to use three types of tests to measure accurately the total accommodation in many patients: (a) The near blur test—after Duane; (b) The "reads best" test—the most common method; (c) The + and −1.00D. spheres average-readability test; (d) The + and −0.50D. spheres coöperation test will show the cause in case of failure.

3. The normal reserve accommodation for all near work is exactly 1.00D.

4. The available accommodation for near work is the total accommodation less 1.00D.

5. The best fixed distance for close work depends on the following factors: (a) visual acuity, (b) nature of occupation, (c) muscle balance, (d) length of arms, (e) monocular or binocular vision, and (f) long-established reading habits. R. W. Danielson.

Sloan, L. L. **Atypical achromatopsia.** Amer. Jour. Ophth., 1946, v. 29, March, pp. 290-294. (3 tables, 3 figures, references.)

Sloane, A. E. and Gallagher, J. R. **Evaluation of stereopsis.** Arch. of Ophth., 1945, v. 34, Nov.-Dec., pp. 357-359.

Increasing use of visual tests in the field of personnel selection, special military needs, and the rapid expansion of aviation have stimulated interest in techniques which measure stereopsis.

The entire student population of a boys' preparatory school was given a thorough ophthalmic examination, and from this group of 720 boys 186 who fulfilled the following requirements were selected for the tests of stereoscopic ability: normal color vision, a normal external ocular condition, normal fundi, normal pupils, a visual acuity of 20/20 in each eye, less than 1.5D. of hyperopia, less than 1.25 prism diopters of hyperphoria, less than 4 prism diopters of exophoria and less than 6 prism diopters of esophoria at 20 feet (6 meters); less than 6 prism diopters of esophoria and less than 8 prism diopters of exophoria at 16 inches (40 cm.), and less than 1.00D of astigmatism. Hyperphoria was measured with the Maddox rod; exophoria and esophoria at 20 feet with the Maddox rod and the cover test, and at 16 inches by von Graefe's prism test and the cover test.

The distributions of the averages of three responses to each of these tests are given, and the higher coefficients of self-reliability between trials on the Verhoeff test are offered as evidence of the superior efficiency of this test. The Verhoeff test is the more sensitive in detecting persons with poor stereopsis. The essayists believe that the Verhoeff test yields a superior estimate of acuity of binocular stereopsis. However, the value of the Howard-Dolman technique in the appraisal of aptitude for activities which require a number of attributes, should be kept in mind.

R. W. Danielson.

4

OCULAR MOVEMENTS

Lijó Pavía, J. **Heterophoria and the orthofusor.** Rev. Oto-Neuro-Oft., 1945, v. 20, Sept.-Oct., pp. 106-111.

Horizontal heterophoria not exceeding 14 degrees should be treated with the orthofusor. This instrument employs stereoscopic photographs, polarizing light, and polaroid lenses. As in a major amblyoscope, each eye can be made to see a separate picture, and by use of prisms the apparent deviation of the eyes can be measured and the phoria treated. Pictures varying in complexity are employed to train and develop binocular single vision. (1 drawing.) Edward Saskin.

Walker, J. P. S. **Operation for correction of paralytic external (lateral) rectus palsy.** Brit. Jour. Ophth., 1945, v. 29, Sept., pp. 477-479.

Two cases are reported in which a modified Lancaster operation for the correction of palsy of the external rectus was done. The internal rectus

was recessed and stitched to the sclera, slightly anterior to the equator. The performance of this recession differs from that of the Lancaster operation. The external rectus was then resected and advanced after the outer third of the superior and the inferior rectus had been stitched to the stump of the insertion of the external rectus.

The outcome of both operations was entirely satisfactory. Synoptophore readings, taken before and after operation, may serve as a guide in other cases. They show that a large angle (45° and 35°) may be overcome and that almost daily improvement is obtained by orthoptic training after the operation.

It is the author's conviction that an advancement should never be performed without a recession of the opposing muscle, even though the recession may have to be only part of the way between the insertion and the equator. (References.)

Edna M. Reynolds.

5

CONJUNCTIVA

Jones, W. Y., Talbot, F. F., and King, W. F. **Stevens-Johnson's disease.** Amer. Jour. Ophth., 1946, v. 29, Feb., pp. 185-189. (2 figures, references.)

Laborne Tavares, C. **Pterygium.** Rev. Brasileira de Oft., 1945, v. 4, Dec., pp. 111-137.

A 27-page review of the literature of the subject, especially as regards the surgical treatment employed by various authors. (Portuguese.) (7 figures, bibliography.) W. H. Crisp.

Lijó Pavía, J., Lachman, R., and Mendia, J. A. **Phlyctenular keratoconjunctivitis. Endonasal tuberculin.** Rev. Oto-Neuro-Oft., 1945, v. 20, Jan.-Feb., pp. 1-8.

In a previous report the authors described the use of endonasal tuberculin in phlyctenular conjunctivitis. It was particularly applicable in children and in those adults in whom a minimal systemic reaction was desirable. Four new cases are reported in this communication. The patients were treated as before, beginning with a dilution of 1:100,000 and increasing to 1:10,000. All patients were female, from 8 to 19 years of age, and had pulmonary tuberculosis and phlyctenular conjunctivitis. After therapy there was systemic and ocular improvement. (1 series of drawings.) Edward Saskin.

Meenan, P. N. **The etiology of trachoma in Ireland.** Irish Jour. Med. Sci., 1945, Nov., p. 670; and Dec., p. 703.

The author presents a preliminary report of an extensive laboratory and clinical study of trachoma in Ireland. He bases his conclusions on the reports of investigators in Ireland and the United States. Most Irish investigators believe that the etiologic agent is a virus rather than a rickettsia. The virus seems to be related to the viruses of psittacosis, lymphogranuloma venereum, and atypical pneumonia. In 49 patients studied, inclusion bodies were found in 19 percent of the eyes in stage I, in 12 percent of those in stage II, and in 5 percent of those in stage III. The author suggests that there may be an unrecognized stage in the life cycle of the virus during which most of the tissue damage is done and in which it might be most susceptible to the sulfonamides.

Morris Kaplan.

Minton, J. **Eye diseases in the East.** The Practitioner, 1945, v. 155, Sept., p. 176.

The author served as military ophthalmologist in Iraq, India, and Ceylon and presents his observations and some practical suggestions for treatment of the eye conditions encountered. Great epidemics of virulent conjunctivitis occur twice each year and cause much blindness from severe corneal disease. Many of the patients are children infected by direct contact with other children who have gonorrheal or diphtheritic conjunctivitis. Instillations of sulfapyridine powder in cod-liver oil were given. Trachoma was found in 60 percent of people of all ages. In India, he found a great number of children suffering from vitamin-A deficiency, with serious corneal involvement. In India, an epidemic of punctate keratoconjunctivitis ascribed to virus infections occurs each year. Its morbidity is very high, and treatment is quite unsatisfactory. It is interesting to note the extremely low incidence of these diseases among the Europeans living in the areas. Morris Kaplan.

Paez Allende, F. **Neurofibromatosis of the bulbar conjunctiva.** Anal. Argent. Oft., 1945, v. 6, Jan.-Feb.-March, pp. 6-17.

Neurofibroma may involve the central nervous system, the outer coverings of the body, and the osseous system. In the eye, the skin of the lids may be invaded with a resultant lid ptosis, or the tarsal and bulbar conjunctiva may be the seat of the affection. In a girl, 18 years of age, only the bulbar conjunctiva was involved. Coexistent with the disease, there were epilepsy, corporal asymmetry, intracranial derangement, skeletal lesions, skin tumors, partial alopecia, and a mild mental retardation. The disease affected the right eye only and involved the bulbar conjunctiva above the limbus up to the caruncle. The lacrimal gland was hyperplastic. A ptosis of the upper lid was present, and there was a punctiform macula in the upper part of the cornea. Vision was reduced to 1/6, and could not be improved. The visual field was within normal limits. Biopsy of the tissue corroborated the diagnosis of neurofibromatosis. The author has considered extirpation of the bulbar growth followed by a buccal mucosa graft. (7 illustrations, bibliography.) Edward Saskin.

Rosen, E. **Heterogeneous conjunctival transplantation.** Amer. Jour. Ophth., 1946, v. 29, Feb., pp. 193-195. (3 figures, references.)

Ventura, Altino. **The surgery of pterygium.** Rev. Brasileira de Oft., 1945, v. 4, Dec., pp. 138-142.

The author deals especially with the conjunctival autoplasty of Paulo, Jr., according to which method over 100 patients have been operated upon in the Recife and other Brazilian clinics. Of these, 52 cases were reëxamined at least six months after the operation and are here surveyed. The McReynolds operation, previously employed, had given a slightly higher percentage of recurrences than the Paulo procedure. The paper was discussed by Pedro Falcão, who dismissed the idea that pterygium is produced by chronic inflammation of the nasal or paranasal region or by external irritation from dust and wind; by Moacyr Alvaro, who pointed out that Dimitry of New Orleans has found a greater incidence of pterygium in Louisiana, without wind and dust, than has been reported from drier states of the North Ameri-

can Union; and by several other speakers. W. H. Crisp.

6

CORNEA AND SCLERA

Blondis, R. R. **Superficial pigmentation of the cornea.** Amer. Jour. Ophth., 1946, v. 29, March, pp. 316-323 (4 figures, references.)

Bonnet, P. **Two new observations on diffuse papillomatous hyperplasia of the cornea developing in old trachomatous pannus.** Jour. d'Opht., 1944, v. 3, No. 3, p. 239.

Two new observations of diffuse papillomatous hyperplasia of the cornea are reported, one in a woman of 47 years with trachoma since the age of 14 years, and the other in a woman of 66 years with trachoma since she was 25 years old. In each case the tumor involved only the cornea. The limbus and bulbar conjunctiva were free. The author believes that chronic irritation is necessary for the formation of these tumors and that in his patients trichiasis was the main source of irritation. He recommends temporary closure of the lids by blepharorrhaphy after extirpation of the tumor to eliminate irritation of the cornea. Phillips Thygeson.

Bonnet, P. **Interstitial keratitis and the Argyll Robertson pupil.** Jour. d'Ophth., 1944, v. 3, No. 3, p. 175.

The author states that the Argyll Robertson pupil is the most rare of all the stigmata of congenital syphilis and that the most common pupillary disturbance is internal ophthalmoplegia. He reports the case of a woman, aged 23 years, with congenital syphilis. She had had an interstitial keratitis at the age of 10 and had received regular antisyphilitic treatment. She showed persistent synechiae. Under the slit-lamp the absence of the light reflex and the presence of a reaction to accommodation convergence were easily demonstrated. Phillips Thygeson.

Buxton, R. J. **Observations on keratoconjunctivitis in military hospitals.** Brit. Med. Jour., 1945, Dec. 15, p. 847.

Forty-two cases of keratoconjunctivitis were examined in various military hospitals. The clinical manifestations and treatment are described in detail. The author found a toxic focus in the nose and throat in 40 percent of the patients, and a dental focus in 26 percent. In several cases, the lesion in the eye improved immediately after tonsillectomy or dental extraction. Occasionally an exacerbation of the ocular inflammation followed the removal of the focus of infection, possibly as an allergic manifestation of a bacteriemia. R. Grunfeld.

Friede, R. **Treatment of serious vitreous losses after keratoplastic operations.** Klin. M. F. Augenh, 1942, v. 108, Nov.-Dec., p. 717.

When the excision of a keratoplastic flap or of plastic iris membrane is accompanied or followed by the loss of a large quantity of liquefied vitreous an attempt must be made to fill the collapsed bulbus. Injection of physiologic salt solution or of vitreous from calves' eyes has been recommended. Friede found it more practical to increase the fluid content of the whole body by administering large quantities of water by mouth. He observed a very rapid replacement of the lost vitreous. Even after complete collapse of the globe, normal configuration was re-

gained within two to three days. One case is reported. F. Nelson.

Gomensoro, J. B., and Isola, W. **The syndrome of blue scleras.** Rev. Oto-Neuro-Oft., 1945, v. 20, Sept.-Oct., pp. 111-119.

A case of blue sclerotics in an individual manifesting general debility and bone disease is described. An academic discussion of the blue-sclera syndrome is presented wherein many investigators are quoted. The characteristic changes in the eye are associated with disturbances in other parts of the body such as fractures, deformities, and radiologically demonstrable alteration of bones; weakness of the ligaments; neuro-muscular debility; deafness; endocrine disturbances; arterial hypotension, and syndactyly. The heredity of the syndrome is discussed. Its development is thought to be a result of a disturbed development of the embryonic tissues, particularly those of the mesenchyme, and also of an imbalance of the endocrine system. Treatment is essentially symptomatic, although thyroid and anterior pituitary extract have been administered with equivocal results. (References.) Edward Saskin.

Harley, R. D. **Ocular leprosy in Panama.** Amer. Jour. Ophth., 1946, v. 29, March, pp. 295-316. (19 figures. references.)

Illig. **The use of digestive ferments in serpiginous corneal ulcer.** Klin. M. f. Augenh., 1942, v. 108, Sept.-Oct., pp. 618-620.

In this brief preliminary report the author discusses the possible usefulness of ferments in the treatment of corneal ulcer. He did some experimental work with rabbits and treated a few patients. He used pancreatic ferment because it is active in an alkaline medium. A standard ointment used in dermatology is tolerated by the normal eye without signs of irritation. In an aged woman whose eye was considered all but lost because of a serpiginous corneal ulcer, the ulcer became clear after three applications of pancreatic-ferment ointment, and the eye healed in a few days more. In two other women, the eyes reacted equally favorably.

Pancreatic ferment does not affect the intact cornea, but promptly dissolves necrotic corneal tissue. Pneumococci were either killed by the ferment or rendered avirulent. F. Nelson.

Mendonça de Barros, J. **Ocular complications of leprosy.** Amer. Jour. Ophth., 1946, v. 29, Feb., pp. 162-171. (5 figures, discussion.)

Minton, J. **Eye diseases in the East.** The Practitioner, 1945, v. 155, Sept., p. 176 (see Conjunctiva, Section 5).

Morate, F. H. **Acute keratitis fugax.** Rev. Oto-Neuro-Oft., 1945, v. 20, June-July, pp. 62-65.

In a sanatorium for bacillary diseases, 27 patients suddenly developed an acute, transitory keratitis. No etiologic agent was isolated, and it did not seem likely that the lesion was a manifestation of a reaction to an allergen or a therapeutic agent. The lesion was usually visible for about nine hours; the subjective symptoms lasted but a few minutes. The pericorneal injection was most marked at the 3- and 9-o'clock locations; the corneal infiltration was usually punctate though it was occasionally linear, and corneal defects could be stained with fluorescein in one half of the eyes; diminished corneal sensibility lasted for a few

minutes to a few days. Systemic treatment with gold given before the onset of the keratitis did not cause a recurrence of symptoms. No treatment was ordered because of the fleeting nature of the disease. Edward Saskin.

Paufique, L., and Bonamour, G. **A new case of keratitis due to varicella.** Jour. d'Opht., 1944, v. 3, No. 3, p. 255.

A young girl, recovering from varicella, developed deep parenchymatous keratitis at a time when the last skin lesions were disappearing. The keratitis was limited to the inferior temporal quadrant of the cornea and was associated with large folds in Descemet's membrane and a few corneal precipitates. There was no iris lesion. Symptoms were minimal, but vision was reduced to 1/3 and was not correctable in the affected eye. The vision of the other eye was 10/10. The keratitis was characterized by its sluggish course. The resemblance to the keratitis of herpes zoster was noted.

Phillips Thygeson.

Roper, K. L. **Senile hyaline scleral plaques.** Arch. of Ophth., 1945, v. 34, Oct., pp. 283-291.

Senile hyaline scleral plaques must be regarded as a clinical entity characterized by the absence of clinical symptoms. The plaques are situated about 3 mm. from the limbus and 1.5 mm. to 2 mm. anterior to the insertions of the rectus muscles. They are generally rectangular but occasionally may be rounded or oval. They are most commonly seen opposite the insertion of the internal rectus muscle but occur next in frequency opposite that of the external rectus muscle. Rarely have they been observed opposite the insertion of the inferior rectus muscle. The patches appear to be somewhat depressed. The sclera in these plaques seems to be even more rigid and resistant than average. On transillumination of the globe, the areas show as relatively clear and translucent windows. The condition apparently is not a hazard to the eye.

Advanced age is largely responsible for predisposition to the disease, since in the aged dehydration and progressive sclerosis of the connective tissue of the entire body occur. It is probably the result of a local nutritional disturbance, which, in turn, is due to arteriosclerotic changes.

The author reports five cases personally observed. There is a detailed review of the literature and a discussion of the anatomic and physiologic characteristics of the sclera. (14 photographs.) John C. Long.

Smelser, G. K., and Ozanics, V. **Effect of local anesthetics on cell division and migration following thermal burns of cornea.** Arch. of Ophth., 1945, Oct., v. 34, pp. 271-277.

The influence of local anesthetics on the healing processes of the cornea was studied in the rat. The effect of the drugs on mitosis and cell migration of the corneal epithelium was investigated. Topical application of most anesthetics inhibits mitosis in the intact corneal epithelium when used in concentrations which produce anesthesia. The inhibition of cell division varies with different drugs, and with the method and frequency of administration. The processes of cell migration and cell division are affected differentially: cell migration may be notably retarded with little or no inhibition of cell division; other drugs inhibit mitosis but do not markedly retard cell migration. These variations make it difficult briefly to summarize the action

of the various agents. The drugs tested included solutions of cocaine hydrochloride, tetracaine (pontocaine) hydrochloride, nupercaine hydrochloride, phenacaine (holocaine) hydrochloride, butacaine sulfate, Chlorobutinal and metycaine hydrochloride. Ointments containing butyl aminobenzoate (butesin), orthoform, butacaine (butyn) sulfate, metycaine and tetracaine were used. It was found that unbuffered aqueous solutions inhibit the healing processes far more than do ointments of the same or greater strength which produce anesthesia of longer duration. Nupercaine and phenacaine ointments produce prolonged surface anesthesia and do not impair mitosis in the normal epithelium, or retard cell division or migration in regenerating corneal epithelium. John C. Long.

7

UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Barlow, A., and Weiner, H. L. **Traumatic iridodialysis: its surgical correction.** Arch. of Ophth., 1945, v. 34, Oct., pp. 292-294.

The authors report the successful correction of a large traumatic iridodialysis by a method devised by Jameson. (1) A curved threaded needle is inserted into the anterior chamber through the sclera posterior to the limbus. As the needle enters the chamber it transfixes the torn iris root and is then brought out through the cornea. (2) A limbal keratome incision is made through which the thread anterior to the iris is grasped and pulled through the corneal wound. (3) The thread is tied, which brings the torn base of the iris back to the sclerocorneal junction. In the case described two threads were used so as to form two sites of attachment to the sclerocorneal junction. The technique is illustrated.

John C. Long.

Fronimopolulos, Johann. **The pathogenesis of serous detachment of the choroid.** Klin. M. f. Augenh., 1942, v. 108, Nov.-Dec., p. 665.

The occurrence of serous detachment of the choroid after operations for cataract and glaucoma has long been known. Its pathogenesis has been the object of research by many investigators and numerous theories have been published. The author used a 1.5 mm. trephine to produce artificial scleral and corneal fistulas in the eyes of young rabbits and dogs. Vitreous fistulas always produce an acute hypotony and deepening of the anterior chamber. The minimum decrease of tension was obtained earlier in dogs' than in rabbits' eyes. If the eyes were trephined a second time after complete recovery the hypotonic maximum was reached much earlier than after the first operation. On one group the operation was performed without anesthesia. A choroidal detachment could not be observed in any eye with vitreous fistula. The eyes usually returned to normal in eight days. The fistula was found completely closed after two weeks. Corneal fistulas were obtained by opening the anterior chamber with a keratome and punching a hole in the periphery of the cornea with Vacher's iris punch. This averts hemorrhage into the chamber, which may obscure the ophthalmoscopic picture. Iris prolapses were replaced with a spatula. The iris-lens diaphragm was always pushed forward because of the ensuing negative pressure in the anterior chamber. A sequel of the resulting hypotony was noticeable hyperemia and occa-

sionally hemorrhage in the choroid. In two thirds of all eyes with corneal fistula a choroidal detachment was observed ophthalmoscopically after about half an hour. In the remaining eyes the fundus was not seen because of hemorrhage from the iris. The onset of hypotony in these artificial vitreous fistulas was retarded by the use of cocaine and novacaine combined with adrenalin. The author believes that the continuous pull on the peripheral parts of the ciliary body causes tiny detachments. As a result of the negative pressure, transudation from the hyperemic choroidal vessels ensues, which eventually leads to the ophthalmoscopically visible choroidal detachment. (63 illustrations, references.) F. Nelson.

Lijó Pavía, J., and Lachman, R. **Congenital aniridia; three cases.** Rev. Oto-Neuro-Oft., 1945, v. 20, Aug., pp. 79-85.

Congenital aniridia may be complete or incomplete, unilateral or bilateral, and is associated with photophobia and diminished visual acuity. Pseudoptosis, microphthalmos, nystagmus, microcornea, corneal opacities, very deep anterior chamber, persistent pupillary membrane, ruptured suspensory ligament, lens opacities or subluxation, vitreous opacities, persistent hyaloid artery, optic atrophy, and fundus depigmentation, are occasionally associated with this congenital anomaly.

Three cases are reported. In the first there was bilateral total aniridia with nystagmus and lens changes; in the second there was total aniridia in one eye, almost total aniridia in the other, pseudoptosis, nystagmus, and excavation of the disc; in the third, a total unilateral aniridia was associated with pseudoptosis, nystagmus, and a pale fundus, while the fellow eye had a normal iris, ectropion, and a senile cataract. (2 illustrations, references.)

Edward Saskin.

Rosen, Emanuel. **Rupture of choroid associated with cyst of vitreous.** Brit. Jour. Ophth., 1945, v. 29, Sept., pp. 486-489.

Injury to the right cornea of a colored male resulted in reduction of vision to 20/200, which could not be improved by refraction. The pupil of the right eye was larger than that of the left and the temporal half of the pupil responded to light and accommodation more promptly than did the nasal half. Slitlamp examination showed a small superficial horizontal scar across the pupillary area of the cornea. The iris showed a definite break in its sphincteric portion at the 3-o'clock position.

The fundus showed a choroidal tear in the macular region running vertically and about three disc diameters in size. Below the disc was a cystic structure 2½ times the size of the disc and shaped like an apple. This sphere seemed to be loosely suspended from a pedicle. As the patient looked upward, the mass would disappear, but upon his looking downward, it would settle back into its original position.

About a month after the first examination, the cyst was found to be ruptured, and the vitreous later showed some signs of clearing.

A similar case of vitreous cyst in a colored female is reported. There was rupture of the cyst with subsequent formation of a macular hole.

The author believes the tendency to excessive proliferation and encapsulation of tissue, as observed among Negroes, is responsible for traumatic cysts of the vitreous. (4 illustrations.)

Edna M. Reynolds.

Spyratos, S. **The precursors of melanin as virulent nucleoproteins in the eye, with particular reference to sympathetic ophthalmia.** Klin. M. f. Augenh., 1942, v. 108, Sept.-Oct., pp. 605-614.

The pigment in all pigment cells consists of protein granules to which the melanin is firmly bound. In the earliest stages of pigment formation these granules are colorless and consist of undifferentiated protein. Later they are transformed into black melanin granules under the influence of a pyrocatechin derivative in the presence of an oxidative ferment which is found in the immature-protein granules. In the eye this transformation normally takes place only in a certain period of embryonic life. When the pigment genesis is complete, the melanoblasts become chromatophores and normally continue in this function for life. Under abnormal conditions, melanophores may react with degeneration and dissolution of the cells and with pathologic proliferation of pigmented epithelial cells. Atypical embryonic melanoblasts form, in which abundant immature atypical protein granules, the precursors of pigment, occur, not only within the cell itself but also in the surrounding tissue. The question arises whether these protein granules are able to interfere with the biologic balance of the melanophores in the healthy fellow eye, and eventually lead to the formation of the same immature protein bodies. The author found a direct relationship between these granules, on the one hand, and the epithelioid cells and infiltration nodules of sympathetic ophthalmia, on the other. Under pathologic conditions *in vivo* and in tissue culture *in vitro*, the pigment granules are engulfed by phagocytes as foreign bodies. The behavior of pigmented epithelial cells and of the chromatophores of the choroid is different. The latter settle around the blood vessels in a characteristic way. Under pathologic conditions they are able to invade blood vessels. Free pigment granules are then found not only in the lumen but also in the endothelium of the vessel. Pigment epithelial cells may pass the barrier of the lamina vitrea and proliferate in the uvea and even cover organized masses of exudate. In histologic preparations impregnation with silver makes mature pigment ganules as well as their colorless precursors visible. With this staining method a direct relationship between free pigment granules and the epithelioid cells found in sympathetic ophthalmia could be established. The granules are found abundantly engulfed by the epithelioid cells. The author conducted numerous experiments with tissue cultures to clarify the reactions of the cells of the organism to free pigment granules. The pathogenic effect of the melanin granules and especially of the precursors of melanin in sympathetic ophthalmia seems to be firmly established. They act as virulent proteins like microbes or viruses. (6 photomicrographs, bibliography.) F. Nelson.

Town, A. E., and Hunt, M. E. **Penicillin in the aqueous humor.** Amer. Jour. Ophth., 1946, v. 29, Feb., pp. 172-175. (3 figures, references.)

8

GLAUCOMA AND OCULAR TENSION

Awerbach, M. L. **Cyclodiathermy in secondary glaucoma.** Amer. Rev. Soviet Medicine, 1945, v. 3, Oct., p. 35.

A general report of the results of 52 cyclodiathermy operations on 49 patients is presented. The author believes

that coagulation of the ciliary body is a safe procedure and reports satisfactory results. The procedure is simple and can be followed by other procedures when it proves ineffective.

Morris Kaplan.

Arruga, H. **Optico-ciliary neurotomy as a treatment for expulsive hemorrhage.** Ophthalmologica, 1943, v. 105, Feb., pp, 106-107.

A patient with painful absolute glaucoma refused enucleation. A retrobulbar injection of alcohol relieved the pain temporarily. A Lagrange operation with iridectomy was started, when an expulsive hemorrhage occurred. Immediate trephining of the sclera was ineffective. Optico-ciliary neurotomy was then performed. The hemorrhage ceased; the eyeball preserved its form; the pain did not recur.

Alice R. Deutsch.

Bhalerao, C. K. **Glaucoma.** The Antiseptic, 1945, v. 42, Dec., p. 706.

The author reviews glaucoma for the general practitioner of India. Several unusual ideas are presented. He believes that surgery should be done in acute congestive glaucoma if the tension remains high after two hours of medical treatment, and that in chronic glaucoma medical treatment is of no value. Morris Kaplan.

Bonnet, P. **Congenital aniridia and chronic glaucoma.** Jour. d'Opht., 1944, v. 3, No. 3, p. 169.

Bonnet reports a case of bilateral chronic glaucoma, in which there was a total aniridia of the left eye. Although the glaucoma of the left eye manifested itself first and progressed to complete loss of vision, the glaucoma of the right eye was almost equally severe. There was no favorable response to miotics. The author believes that there may have been a developmental anomaly in the right eye to account for the glaucoma. Phillips Thygeson.

Gallois, Jean. **Nicotinic acid in ophthalmology and the principle of minimal elective vasodilation.** Arch. d'Opht., 1945, v. 5, No. 2, p. 197.

According to Gallois, the use of a vasodilator always carries a certain risk. Acetylcholine has frequently produced elevation in tension in mildly glaucomatous eyes. He has used nicotinic acid with satisfaction. It gives a vasodilation without modification of the arterial pressure and can be used either by mouth or by intramuscular or intravenous injection. He reports a series of 29 patients with chronic glaucoma in which the use of the drug resulted in significant lowering of the tension and increase in visual acuity and fields. In nine patients results were unfavorable. The favorable results were obtained in glaucoma at onset, glaucoma of slow evolution, and glaucoma with only slightly elevated tension. An individual oral dose of 30 mg. was usually satisfactory. General and local reactions could be expected within an hour. The treatment was given daily for three days of each week. Occasionally it was necessary to reduce the doses to 20 or even to 10 mg.

Phillips Thygeson.

Guerry, D. III. **Congenital glaucoma after maternal rubella.** Amer. Jour. Ophth., 1946, v. 29, Feb., pp. 190-193. (References.)

Lutman, F. C. **Diathermy for the treatment of glaucoma.** Amer. Jour. Ophth., 1946, v. 29, Feb., pp. 180-184. (Table, references.)

Marchesani, O. **Ophthalmomalacia (essential hypotony).** Klin. M. f. Augenh., 1942, v. 108, Nov.-Dec., p. 692.

The author describes three cases of typical essential hypotony with linear opacities in the cornea. In a man, 18 years of age, whose right eye had been enucleated because of unbearable pain and progressive atrophy six months before, the left eye became similarly affected. The eye was inflamed and photophobic, and the cornea had gray subepithelial irregular linear opacities. The corneal parenchyma was clouded, and the tension was very low. During five weeks of hospitalization, improvement of all symptoms was observed; three weeks later there was a recurrence. Histologic examination of the right eye revealed pronounced thickening of the corneal stroma and epithelium at the site of the linear opacities. Iris and ciliary body were edematous. In the second patient, a man 33 years of age, a typical linear keratitis in the right eye was associated with hypotony and symptoms of a sympathetic paresis on the right side. He recovered fully without treatment and a recurrence four weeks later in the left eye healed within three weeks. The third patient, a man 44 years of age, was injured in a motorcycle accident. The right eye was destroyed completely, the skull and some other bones were fractured. There was right-sided Bell's palsy. The left eye had suffered contusion. The initial intraocular pressure was unmeasurably low, there was a temporal hemianopsia, and pallor of the disc. The visual acuity eventually improved to 5/15. To explain the pathogenesis of the ophthalmomalacia the author postulates a disturbance of the exchange of the intraocular fluid which is opposite to that of primary glaucoma. In these patients capillary microscopy of the fingernail beds usually reveals a disturbance of the capillary circulation, and the blood pressure is low. (1 color plate, 4 photomicrographs, 2 capillary photomicrographs, bibliography.) F. Nelson.

Redslob, E., and Delbos, R. **Sympathetic ophthalmia without manifest exciting inflammation.** Ophthalmologica, 1943, v. 105, Feb., pp. 83-90.

An unusual sympathetic ophthalmia gives the opportunity to discuss Redslob's theory concerning the pathogenesis of this disease.

A left eye with a double traumatic perforation developed a severe purulent iridocyclitis immediately after the accident. The eyeball became pale, and there were signs of early shrinkage. No corneal precipitates were visible. An unexplained orbital pain remained. Three months later, a low-grade iridocyclitis with corneal precipitates developed in the uninjured eye and caused considerable impairment of vision. The injured eye was enucleated at once. A nonspecific inflammation was found in the neighborhood of the wound, and there was sympathizing ophthalmitis in the posterior part of the choroid.

To explain these findings the authors refer to Redslob's theory of the pathogenesis of sympathetic ophthalmia. The etiologic agent of the sympathetic ophthalmia is believed to invade the perforating wound with its enclosed uveal tissue. Here it causes a primary focus of inflammation. An inactive period follows during which the uvea becomes sensitized to uveal tissue. The sensitizing agent reaches the choroid through the short posterior ciliary arteries, and the iris and ciliary body

through the long posterior ciliary arteries.

In the present case the long posterior ciliary arteries were spared, and the iris and ciliary body were not affected; therefore, a clinical diagnosis in the injured eye was not possible. There were no characteristic changes in the anterior part, and the fundus could not be seen. The severe orbital neuralgia which disappeared after enucleation might be a suggestive diagnostic sign.

Alice R. Deutsch.

Reese, A. B. **The iridencleisis operation for glaucoma.** Arch. of Ophth., 1945, v. 34, Nov.-Dec., pp. 360-368.

The feeling prevails to some extent that it is not a sound surgical procedure to incarcerate iris tissue deliberately for the relief of glaucoma when on all other occasions an effort is made to prevent such an occurrence.

On Reese's service the operation has been performed on 110 eyes, during the past three years, and this report is based on the experience encountered in that series of consecutive operations.

An incarceration of prolapsed iris may be good or bad, depending on the manner in which it occurs. After an operation, especially a cataract extraction, an incarceration may lead to a filtering cicatrix or to secondary glaucoma. If the iris is incarcerated as a wick of tissue with the surfaces of the pigment epithelium together, it is more likely to produce a filtering cicatrix.

When an iridotasis is done, the sphincter muscle pulls the pupillary border of the iris partly back into the anterior chamber. This leaves a pocket of iris which blocks the wound increasingly because of its progressive dilation by the aqueous. This can best be prevented by cutting the sphincter muscle, extending the radial incision in the iris to the very periphery of the iris, and there leaving no portion of the root of the iris over the site of the coloboma.

The technique here described incorporates these factors.

A keratome section is made under a large conjunctival flap. The point of the keratome engages the conjunctiva at least 10 mm. from the limbus, and the conjunctiva is dragged down over the point of the keratome to the point of scleral puncture. Three-fourths the length of the keratome blade is introduced into the anterior chamber, and the conjunctival opening is enlarged on each side with a scissors. The operator withdraws the iris by grasping it at the pupillary margin. An assistant holds the irris on the opposite side, and in unison they withdraw the iris until an iridodialysis is just noted. Then a radial cut is made through the iris into the iridodialysis opening. The assistant releases the iris, and the operator then incarcerates each pillar into the corner of the wound with a minimum of manipulation. The conjunctiva is closed with interrupted silk sutures. Drops are not instilled.

The most important step in the operation is a correct incision. This should be made far back so that the point of the keratome enters the anterior chamber in or close to the chamber angle.

The operation is effective primarily because the wicks of iris produce a vicarious filtering sluiceway, but also because the iridodialysis frees the chamber angle over the coloboma area. This gives the effect of a basal iridectomy. When the iris is pulled up and out of the wound above, the iris below is stretched; which widens the angle and prevents the iris from blocking the

filtration angle. This widening of the angle below can be observed by gonioscopic examination.

Iridencleisis produces less drainage. It is therefore indicated when the maximal tension is less than 50 mm. Hg (Schiøtz), and the basal pressure is 30 mm. Hg or less.

When one or more operative procedures have failed, the use of iridencleisis has not proved satisfactory.

When Reese advises surgery for glaucoma in an eye which still has normal vision and a normal field he prefers that there be not only an excellent chance of arresting the disease but that there is negligible danger of complications. This is definitely true of iridencleisis.

Sympathetic inflammation has not appeared in this series. He believes, however, that the incidence of sympathetic inflammation must be somewhat higher after iris-inclusion operations than after other intraocular operations.

The article is followed by valuable discussion. (Nine figures.)

R. W. Danielson.

Tartar, J. **How do the hormones of the posterior lobe of the pituitary gland affect glaucoma?** Klin. M. f. Augenh., 1942, v. 108, Nov.-Dec., p. 737.

Recent investigations have shown that the regulation of the intraocular pressure depends partly upon the function of certain endocrine glands. Many different endocrine preparations, among them meropitan, which is an extract of the posterior lobe of the pituitary, have been used successfully to reduce the intraocular pressure in simple glaucoma. The author observed more than 100 cases of glaucoma, 45 of them simple glaucoma, 3 acute inflammatory glaucoma, 24 chronic inflammatory glaucoma, 15 absolute glaucoma, 4 juvenile glaucoma, and 5 postoperative glaucoma. Some of them had not been treated with any miotics previously, in others there had been continuously high tension in spite of the use of miotics. He used pituisan, which contains all the hormones of the posterior lobe, oxytocin, and vasopressin. The extracts were administered either subconjunctivally or intramuscularly. Oxytocin and vasopressin appeared to be ineffective. In 24 cases decrease of the tension was obtained, in eight a very sudden drop. Absolute glaucoma, juvenile glaucoma, and acute inflammatory glaucoma did not respond to posterior-lobe extract. Simple and chronic inflammatory glaucoma responded best, but the response was usually of short duration and rarely permanent. When the glaucoma was probably a manifestation of an endocrine disturbance, results were most striking. (1 chart, bibliography.) F. Nelson.

Troncoso, M. U., **Diathermy in glaucoma.** Amer. Jour. Ophth., 1946, v. 29, March, pp. 269-290. (18 figures, references.)

Weekers, Roger. **Incomplete glaucoma. A contribution to the study of glaucoma without hypertension.** Ophthalmologica, 1942, v. 104, Dec., pp. 316-331.

Changes in the intraocular vessels are responsible for the symptom complex called chronic idiopathic glaucoma, whose classical signs and symptoms—namely, hypertension, glaucomatous cupping, and the typical constriction of the visual fields—are caused by changes in the blood vessels of the uvea, optic nerve, and retina.

There are cases of glaucoma in

which there are a pathologic cupping and a characteristic constriction of the visual fields but normal ocular pressure. Wiekers refers to glaucoma without hypertension "incomplete glaucoma." Cases of optic trophy with excavation but without hypertension and without the typical defects in the fields he calls "monosymptomatic glaucoma."

Personal observations and cases from the literature are discussed. (4 figures, references.) Alice R. Deutsch.

9

CRYSTALLINE LENS

Albaugh, C. H. **Congenital anamolies following maternal rubella.** Jour. Amer. Med. Assoc., 1945, v. 129, Nov. 10, p. 719.

Conclusions are drawn from 78 cases of maternal rubella during pregnancy, previously reported, to which the author adds nine. All of the babies whose mothers were infected with rubella during the first two months of pregnancy and one half of those whose mothers were infected during the third month had congenital anomalies. The commonest lesions were cataract, defects of the cardiac septum, patent ductus arteriosus, deaf-mutism, and microcephaly. It is suggested that all girls be exposed to rubella before maturity. An effective vaccine is desirable. The propriety of legal abortion should be discussed. Morris Kaplan.

Bonfioli, A. **Sutures in the cataract operation.** Rev. Brasileira de Oft., 1945, v. 4, Dec., pp. 149-175.

The author describes and illustrates the sutures employed by various operators, and concludes by describing the special scleroconjunctival suture used in the ophthalmic clinic of the São Geraldo Hospital of Belo Horizonte. He considers that cataract operation demands a sclerocorneal suture for safety and efficiency. (Numerous illustrations, bibliography.) W. H. Crisp.

Cole, H. N., Giffen, H. K., and others. **Congenital cataracts in sisters.** Jour. Amer. Med. Assoc., 1945, v. 129, Nov. 10, p. 723.

Congenital ectodermal dysplasia in two sisters aged 10 and 22 months is described. These are unique in that all of the ectodermal tissue is involved. There was bilateral congenital cataract and severe internal strabismus.

Morris Kaplan.

Girardet, M. **Another family with central pulverulent cataract.** Ophthalmologica, 1943, v. 105, Jan., pp. 24-36.

The clinical appearance and the mode of transmission of a hereditary, central cataract in an afflicted family are discussed.

The cataract manifests itself as a central, punctate opacity which has slight morphologic variations so that four different groups can be distinguished.

1. A discoid opacity in the embryonic nucleus with a clear central interval as described by Poos.

2. A discoid, sharply outlined opacity in the embryonic nucleus with coarse punctate opacities in the central interval as described by Vogt.

3. A combination of the manifestations of 1 and 2.

4. Special atypical opacities which consist of a delicate circle superimposed on a dense, irregular Y.

When these malformations appear in their characteristic forms, similar to their ancestral genotype, they follow the law of dominant heredity. The atypical forms are not hereditary. It is

presumed that their appearance is a sign of a change in the transmitting gene. (5 figures, references.)

Alice R. Deutsch.

Hymes, Charles. **Scleral flap incision with scleral sutures for the cataract operation.** Arch. of Ophth., 1945., v. 34, Nov.-Dec., pp. 374-377.

In order to overcome all the handicaps of other types of sutures and at the same time to afford firm and exact apposition of the lips of the wound, the technique of the scleral-flap incision and scleral suture was devised. A description follows:

A small conjunctival flap of about 3 mm., is dissected over the upper half of the cornea to the limbus. The eyeball is fixed with a scleral pick, and the scleral flap is made by means of a scleral knife which is concave anteriorly, or by a Lundsgaard knife. The incision starts 1 to 1.5 mm. above the limbus, and the scleral knife is kept at a shallow level while the incision is made, in order to avoid cutting through the sclera, which at this place is 0.5 mm. thick. The knife is carried toward the limbus and stops short of opening the eyeball.

A fine black-silk suture on a sharp, curved atraumatic needle is passed through the conjunctival flap, the tip of the scleral flap, and the corresponding portion of the upper scleral lip and, finally, the edge of the bulbar conjunctiva, above. The loop is drawn aside to permit the making of the incision.

When the scleral flap is turned downward toward the cornea, an interval of 1.5 to 2.5 mm. is created between the two parts of the suture, the size depending on the height of the scleral flap. This leaves ample space for the cataract knife to pass without the risk of cutting the suture. For additional accuracy, however, Hymes prefers to use the keratome and scissors in making the incision.

Should the anterior chamber be very shallow, as in a case of glaucoma combined with cataract, an ab externo incision may be made.

On completion of the extraction, the scleral suture is firmly tied, and two or more auxiliary conjunctival sutures are placed. (8 figures.) R. W. Danielson.

Irvine, R. S. **Removal of the dislocated lens under a conjunctival pocket flap.** Arch. of Ophth., 1945, v. 34, Nov.-Dec., p. 398.

Irvine has developed and used in 10 cases a technique emphasizing the following features: a vertical incision of the conjunctiva, about 13 mm. long, beginning 5 mm. from the limbus, at the 9-o'clock position in the left eye and at the 3-o'clock position in the right eye; wide separation of the conjunctiva over the upper half of the globe; opening of the anterior chamber, with a keratome incision, under the everted edge of the flap; completion of the section, with scissors, under the flap; extraction of the lens with the loop; depressing the sclera under the flap, and a water-tight closure of the incision.

Irvine has been surprised at the small loss of vitreous. His only explanation is that the positions of the conjunctival and corneal incisions do not coincide. R. W. Danielson.

10

RETINA AND VITREOUS

Bonnet, P., Chauvire, E., and Gallet, M. **A case of methyl-alcohol poisoning with amelioration by stellate ganglion block.** Jour. d'Opht., 1944, v. 3, No. 3, p. 220.

The authors report the case of a man aged 54 years, who became suddenly blind following the imbibing of methyl alcohol. When first seen the patient had no light perception. The pupils were dilated and fixed to light but reacted to accommodation-convergence. There was edema of the nervehead and retina. The urine contained albumin which disappeared in 48 hours. Treatment consisted in (1) daily stellate ganglion blocks alternately on the right and left, (2) daily subcutaneous injections of strychnine, and (3) daily intravenous injections of acetylcholine and "bevitine." Light perception returned on the seventh day. Two days later vision was 1/6 in the right eye and 1/100 in the left, with improvement to 1/2 and 1/15, respectively, 48 hours later. The final visual acuity obtained was right 2/3 and left 1/15, with a normal visual field in the right eye but a large central scotoma in the left.

The authors call attention to the late appearance of spasm of the retinal vessels in this patient. They believe that the stellate ganglion blocks were of value in minimizing the vascular phenomena, which they consider a very important factor in methyl-alcohol intoxications. Phillips Thygeson.

Bonnet, P., Paufique, L., and Bonamour, G. **Detachment of the retina and tuberculosis. Military tubercles, periphlebitis, and retinal detachment.** Jour. d'Opht., 1944, v. 3, No. 3, p. 210.

The authors report the case of a man 58 years of age with a detachment of the upper temporal part of the retina of the left eye and multiple tubercular lesions widely scattered over the fundus. Visual acuity was 2/10. Physical examination showed an old fibrous pulmonary tuberculosis. The retina was reattached by diathermy coagulation.

They also report the case of a man 39 years of age with a retinal detachment of the right eye involving the entire lower half of the retina. Vision was reduced to 1/8. The superior temporal vein showed a periphlebitis, and in this quadrant there were multiple foci of choroiditis with connective-tissue proliferation. Periphlebitis of the retinal veins was also noted in the left eye. General physical and radiologic examination revealed no evidence of pulmonary or other tuberculous lesions, but the authors consider that the ocular lesions were probably tuberculous in nature.

They stress the value of meticulous examination of the apparently normal eye in all cases of retinal detachment.

Phillips Thygeson.

Bonnet, P., and Paufique, L. **Thrombosis of the central retinal vein, or of its branches, due to syphilis.** Jour. d'Opht., 1944, v. 3, No. 3, p. 172.

The authors note that syphilitic involvement of the retinal veins is rare. They report four cases of thrombosis due to syphilis recognized by clinical and serologic signs and by therapeutic response.

The first patient, 60 years of age, had a typical thrombosis of the central retinal vein with edema, hemorrhages, and a vision of 3/10. The Wassermann and Kahn reactions were strongly positive. Muthanol was used in treatment, with a progressive return of vision and a rapid diminution in the retinal signs. A return to a vision of 10/10 was obtained without residual changes in the fundus.

The second patient, 51 years of age, had a thrombosis of the inferior retinal

veins. Blood tests for syphilis were positive. Specific treatment resulted in complete healing in three months.

The third observation was of a woman 32 years of age who had a thrombosis of the superior temporal vein of the right eye with a vision of 4/10. Specific treatment resulted in rapid improvement; four months later vision was normal and the fundus appeared normal.

The fourth patient, a man 46 years of age, showed the typical picture of thrombosis of the central vein, although his vision was still 10/10. He gave a history of syphilis discovered 10 years previously, treated regularly, and pronounced cured after seven years. The Wassermann and Kahn reactions were negative. Nevertheless specific treatment was started and improvement was slow but satisfactory.

The characteristics of syphilitic thrombosis are described by the authors after a review of the literature as consisting in (1) pronounced dilatation and tortuosity of the retinal veins, (2) striking response to specific treatment, (3) absence of arterial hypertension, and (4) lack of marked diminution in visual acuity.

Phillips Thygeson.

Espildora Luque, C. **Recurrent retinal detachment.** Arch. Chilenos de Oft., 1945, v. 1, March-April, pp. 25-27.

In a man, aged 43 years, there was a persistent tendency to recurrence of the detachment in various parts of the upper segment of the retina, without any invasion of the macular region or of the lower half of the retina. Reappearance of the detachment occurred in a zone, already cauterized, which became reattached after a second intervention. The eye tolerated four operations without complication, in spite of the fact that the other eye was in a maximal condition of pthisis bulbi after a single operation for the same retinal condition. The amount of myopia in the eye whose upper sector had been so frequently and extensively cauterized underwent no change.

W. H. Crisp.

Freusberg, O. **Fundus lesions in spotted typhus. Preliminary report.** Klin. M. f. Augenh., 1942, v. 108, Sept.-Oct., p. 621.

The author gives a preliminary report of fundus lesions in spotted typhus observed at the Russian war front. Abnormalities of the eyeground were found in 15 to 20 percent of all patients. He describes three characteristic cases. All had a more or less pronounced papilledema, retinal edema, and perivascular nodules. Considerably rarer were small choroidal lesions which left pigmented atrophic areas when healed. The fundus changes occurred during the period when the exanthem reached the highest point between the fifth and ninth day after onset of the disease. At the end of the third week fundus changes were usually not found, with the exception of the papilledema, which gradually disappeared during the period of convalescence. A complete report with histologic findings will appear later.

F. Nelson.

Lijó Pavía, J. **Alterations of the hypophyseal region. Treatment with gonadotropin.** Rev. Oto-Neuro-Oft. 1945, v. 20, June-July, pp. 53-61.

Three patients are presented in whom hypophyseal derangements were suspected following fundus and visual-field studies. All had a markedly di-

minished visual acuity and a contraction of the field which was usually irregularly concentric. Fundus studies revealed arterial narrowing, and a retinopathy characterized by atrophy of the inner layers of the retina, especially in the macular area. On the basis of the observations of several investigators and on roentgenograms of the sella turcica, the author ascribed these conditions to hypophyseal alterations. He prescribed sex hormones to restimulate the circulation, especially in the retinal arterioles and the choroidal vessels. Some improvement of visual acuity is reported. (7 retinographs, references.) Edward Saskin.

Paufique, L., and Bonamour, G. **The prognosis of retinal-detachment operations in myopes.** Jour. d'Opht., 1944, v. 3, No. 3, p. 199.

In a series of 200 retinal detachments the authors observed 89 in myopic eyes. The right eye was involved slightly more frequently than the left, and detachment was slightly more frequent in myopic females than in myopic males. In most cases there was only one retinal tear, and this was frequently located in the upper temporal quadrant. Detachments in myopia greater than 10 diopters occurred almost exclusively before the age of 50 years; in eyes with a myopia of less than 10 diopters they usually occurred after 50 years of age.

Of the 89 patients nine were not treated, seven because of obvious contraindications such as thrombosis of the central vein and active chorioretinitis. In the 80 surgical operations the authors obtained 59 reattachments and had 21 failures. Six of the reattachments required reoperation because of recurrence.

Of the 21 failures, 10 were in individuals over 60 years of age. Vitreous hemorrhage occurred in four of these and in three there were gross tears with floating flaps which could not be obliterated at operation. In the other three no ocular reason for failure could be determined, but the patients were all suffering from severe arterial hypertension. Of the 11 failures in patients below the age of 60 years, two had myopia of more than 20 diopters with total detachments complicated by multiple tears; two were in patients with severe posttraumatic detachment, one complicated by subluxation of the lens and the other by vitreous hemorrhage; two were in individuals over 70 years of age; one was in an old detachment without visible tears; and one was in a patient with total detachment and numerous tears near the ora serrata extending over three-fourths of the retinal circumference. Finally, there were three cases which were considered clinically to have a favorable prognosis but in which healing did not follow.

In the 59 patients with reattachment there were only three in which a vision of less than 1/10 was obtained. Six had between 1/10 and 2/10, 30 had between 2/10 and 5/10, and there were 10 with an acuity above 5/10. The authors conclude that they would have had an operative success of 93 percent if the figures were revised to eliminate the truly inoperable and the aged myopic eyes in which detachment could be considered more arteriosclerotic than myopic. Phillips Thygeson.

Paufique, L., and Bonamour, G. **Thrombosis of the central retinal artery in a child.** Jour. d'Opht., 1944, v. 3, No. 3, p. 222.

A child nine years of age suddenly lost the vision of the right eye. There were no prodromal symptoms and no

irritative signs or pain in the eye. The next day ophthalmoscopic examination revealed the characteristic picture of thrombosis of the central retinal artery. Paracentesis of the anterior chamber was performed immediately and systemic treatment with acetylcholine and "muthanol" instituted, but there was only insignificant improvement in the fundus in the next few days. General physical examination was negative. The Bordet-Wassermann reaction was negative. The Kahn and the Meinecke reactions were questionably positive. The father, however, had been treated some time previously for a syphilitic gumma, and on this basis the authors concluded that the lesion in the child was probably due to congenital syphilis. They stress the rarity of thrombosis of the central artery in children. Phillips Thygeson.

Paufique, L., and Bonamour, G. **Prognosis of operations for senile retinal detachments.** Jour. d'Opht., 1944, v. 3, No. 3, p. 226.

The authors report statistics on 57 senile detachments. They define senile detachments as those occurring in the aged in the absence of marked refractive error, traumatism, tumor, secondary-membrane formation, or tuberculous or syphilitic lesions. About 30 percent of detachments fell into this group. They showed no special clinical characteristics except frequent sclerotic changes in the retinal vessels. Of the 57 detachments, 46 were treated surgically, with success in 22. Of the 24 failures, 8 had initial reattachment followed by recurrence during the first three months of observation. Probable causes of failure included giant tears, massive postoperative vitreous hemorrhage, and multiple tears. In the 22 successes there were three patients with a visual acuity between 2/3 and 1, 13 with acuity between 1/4 and 1/2, and 6 with acuities between 1/10 and 1/6. The prognosis is definitely poorer for senile detachment than for other forms, and caution is recommended in advising operation in the aged who have one normal eye.

Phillips Thygeson.

Reca, A. B. **Coats's exudative retinitis.** Anal. Argent. Oft., 1945, v. 6, Jan.-Feb.-March, pp. 1-5.

The condition is characterized by whitish masses at the posterior pole of the retina, occasionally including the disc, with or without vascular changes. Associated miliary aneurysms have been observed. The disease usually progresses with complications, detached retina, secondary cataract, iridocyclitis, and glaucoma. The latter occasionally necessitates enucleation. Tuberculosis, syphilis, and childhood diseases have been discussed as etiologic factors.

A 17-year-old girl is described, who, in the left eye, had typical massive exudative retinitis which was temporal to the disc and involved the macular area. All laboratory tests were negative. A differential diagnosis must exclude hereditary macular degeneration, disciform degeneration of the macula, retinitis circinata, tuberculous exudative retinitis, retinal degeneration with miliary aneurysms, tumors, and von Hippel's disease. (1 illustration.)

Edward Saskin.

Rodin, F. H. **Hypertensive retinopathy associated with adrenal medullary tumor (pheochromocytoma).** Arch. Ophth., 1945, v. 34, Nov.-Dec., pp. 402-407.

Pheochromocytoma is a rare form of chromaffin tumor, characterized by

a train of hypertensive symptoms, including definite ocular changes.

Epinephrine or an epinephrine-like pressor substance is contained in the cells of this tumor. Large amounts of this substance freed into the blood stream cause vasoconstriction, elevate blood pressure, and stimulate the sympathetic nervous system, producing paroxysms of hypertension. In the eye, changes are typical of hypertensive retinopathy.

Extensive changes in the retinas, characterized by changes in the retinal vessels, hemorrhages, and formation of exudate, were observed in a patient with an adrenal medullary tumor (pheochromocytoma). After removal of the tumor the ocular phenomena disappeared, as illustrated by serial photographs. There is no definite explanation of the mechanism by which the retinal changes are produced.

R. W. Danielson.

Vetter, J. **Unilateral thrombosis of the central vein as a result of chronic chromate poisoning.** Klin. M. f. Augenh, 1942, v. 108, Nov.-Dec., p. 720.

Chromic acid and its salts are poisonous. Workers in chromium-plating factories are constantly exposed to the fumes and dust of chromium compounds. Chronic rhinitis with destruction of the nasal mucous membrane and perforations of the nasal septum are the most characteristic result. Chronic bronchitis and bronchial carcinoma have been observed. Conjunctivitis and keratitis, and, less frequently, ulcers of the lids are seen. Fundus changes have been reported rarely. Vetter describes a man, 36 years of age, who had been employed in a chromium-plating factory for 16 years, who showed superficial and deep corneal opacities with regional vascularization in the left eye and a typical defect of the nasal septum. He had several recurrences in both eyes over a period of years. In January, 1942, the patient returned with a typical thrombosis of the left central retinal vein with central scotoma and some loss of vision. Rapid and almost complete recovery followed when the patient was removed from exposure to chromates. (Bibliography.) F. Nelson.

11

OPTIC NERVE AND TOXIC AMBLYOPIAS

Ostow, Mortimer. **The significance of the depth of the physiologic cup of the optic disc for mental ability.** Jour. Nervous and Mental Disease, 1945, v. 102, Dec., p. 571.

The author found a correlation between the depth of a physiologic excavation of the disc and intelligence. Four hundred and eighty persons, patients in mental hospital and nonpsychotic prisoners, were examined. Among persons of high intelligence the greater number had a deep excavation of the disc, whereas flat discs predominated in individuals of low intelligence.

No relation was found to exist between disc cupping and the type of mental abnormality.

The author suggests that the physiologic excavation of the disc may be a manifestation either of an advanced stage of maturation of the structures of the central nervous system or of a superior type of physical growth. Superior intelligence might be another manifestation of the same process.

R. Grunfeld.

Tupin, M. **A case of posthemorrhagic amblyopia.** Jour. d'Opht., 1944, v. 3, No. 3, p. 246.

A case of amblyopia in a man aged 37 years, suffering from hemorrhage secondary to a gastric ulcer, is reported. Vision 2½ months after the hemorrhage was O.D. 5/10 in the right eye and perception of fingers at 10 cm. in the left. Ophthalmoscopic examination revealed optic atrophy, and the visual field of the better eye was limited to the central area plus a superior sector. The patient's general physical condition was good at the time. Post-hemorrhagic amblyopia is fairly common; reports of 250 cases have been reported up to 1935. In 87 percent of the reported cases the amblyopia was bilateral and the onset was most frequently between the third and sixteenth days; in about 40 percent of the reported cases some vision was recovered. Ischemia alone is insufficient to explain the pathogenesis of the amblyopia, since it occurs in only a small percentage of patients with severe hemorrhage. There is a widespread belief that some disturbance in the general health is necessary for the production of amblyopia. The subject of this report was a prisoner of war for 3½ years and consequently suffered from a dietary deficiency.

Phillips Thygeson.

Yaskin, H. E., and Alpers, B. J. **Foster Kennedy syndrome with post-traumatic arachnoiditis of optic chiasm and base of frontal lobes.** Arch. of Ophth., 1945, v. 34, Nov.-Dec., pp. 399-401.

The syndrome of atrophy of the optic nerve of one eye and papilledema in the other eye has come to be regarded as evidence of a tumor lying at the base of the frontal lobe. This relation was first pointed out by Paton (1909) and was further elaborated by Foster Kennedy (1911). Recent studies have indicated that the syndrome may be found at times in association with arteriosclerosis of the internal carotid arteries, which compress the optic nerves and chiasm. The Foster Kennedy syndrome may thus be found in conjunction with disorders other than tumor and the conditions under which the syndrome may occur have been studied. Experience with a recent case indicates that it may develop also as a result of arachnoiditis in the region of the optic nerves and optic chiasm. This case is reported in detail.

R. W. Danielson.

13

EYEBALL AND ORBIT

Babel, Jean. **A histologic study of ocular rheumatism.** Ophthalmologica, 1942, v. 104, Nov., pp. 243-253.

Babel reports the clinical and pathologic findings in a case of a severe recurrent sclerotenonitis. He emphasizes the similarity between the histologic findings in the eye and in the other organs. The eye which he studied histologically was examined in a stage of regression of the primary disease, whereas the eyes previously described were all in the latest stage of the disease and were enucleated because of absolute glaucoma.

A man, 35 years of age, who had suffered from a recurrent rheumatic sclerotenonitis died of cardiac insufficiency. Pathologic studies of the right eyeball and the other organs is reported in detail. There was extensive dilatation of the veins and capillaries and a dense perivascular infiltration which consisted of lymphocytes, plasma cells, large, bright cells with basophile granules (similar to Aschoff's cells), and an occasional multinucleated giant cell. Those changes

were seen in the sclera, Tenon's capsule, the uvea, and the extraocular muscles. In the periorbital tissue there were similar aggregations of cells about the ciliary nerves. There also were typical rheumatic nodules in the extraocular muscles, where they formed a real rheumatic myositis. There was vascular sclerosis in the retina, and Tenon's space was obliterated. The optic nerve was normal despite the dense peribulbar infiltration. The cornea, lens, and vitreous were normal. Similar but less typical nodules were found in the myocardium, and in the synovial membranes. (References, 5 figures.)

Alice R. Deutsch.

Mattos, W. B. **Palpebroconjunctival autoplasty.** Arquivos Brasileiros de Oft., 1945, v. 8, nos. 4 and 5, pp. 103-109.

The author briefly summarizes his own technique, as follows: He first incises horizontally the conjunctiva lining the cavity, parallel to the lid margins, from one canthus to the other. He then dissects back the conjunctiva to form two flaps, upper and lower. Three U-shaped sutures are passed in each conjunctival flap, coming out along the superior tarsal border in the skin of the lids. These are tied over a roll of gauze. In this way the loose conjunctiva will cover the posterior surface of both lids, leaving in the depth of the orbit a large area which is to be covered with the graft. Including all the layers of the skin, and of a size and form capable of covering all the denuded orbital area, a pedunculated flap is cut from the temporal region, the tissues are buttonholed a little outside and below the external canthus, at the orbital margin, and the flap is introduced through the buttonhole, its tip being tied at the caruncle to maintain proper position. The skin is sutured in the temporal region. The angles formed by the grafted skin and by the conjunctiva transplanted under the lids form the upper and lower cul-de-sacs. After six days all the sutures are removed, and the transplanted skin within the buttonhole is strongly curetted to avoid formation of a fistula as the result of nonresection of the pedicle. (8 illustrations, 4 in color.)

W. H. Crisp.

14

EYELIDS AND LACRIMAL APPARATUS

Balod, K. **An improvised dacryocystorhinostomy needle.** Klin. M. f. Augenh., 1942, v. 108, Sept.-Oct., p. 626.

Since it is not always possible to obtain special instruments during war time, Balod improvised a needle for dacryocystorhinostomy by bending the tip of a hypodermic needle to form a hook of desired size and angle after heating it in an alcohol flame. To obtain a suitable eye, the hook was filed tranversely near the tip until a hole of sufficient size was obtained to admit the suture. The finished needle was attached to an ordinary syringe that served as a handle. (1 illustration.)

F. Nelson.

Cutler, N. L. **Surgery for upper-lid atrophy.** Amer. Jour. Ophth., 1946, v. 29, Feb., pp. 176-179. (7 figures, references.)

Hall, Arthur. **The origin and purposes of blinking.** Brit. Jour. Ophth., 1945, v. 29, Sept., pp. 445-467.

The work reported is the result of an inquiry undertaken to find out to what extent the rate of blinking is reduced in the patient with chronic encephalitis.

The average rate of blinks per minute by patients with chronic encephalitis when in conversation was less than half that of normal subjects; yet when reading aloud, the rate of blinking was practically the same in the two groups.

Most of the blinking which occurs in daily life is in no way connected with the efficient action or protection of the eyes themselves but plays a part in the preservation of the organism as a whole. It is so brief that it does not interfere with vision and one is not aware of its occurrence. It varies in frequency and purpose.

A review of blinking in other vertebrates, which is indistinguishable from that in man, is given. Two involuntary unconditioned reflexes are inherited by all animals. These reflexes are opposed and cannot be in action at the same time. There are two distinct and opposed cortical ocular reflexes: one is excited by extramacular stimuli and effects movements of the eyes; the other is of macular origin and holds an object in central fixation. The extramacular reflex is more primitive in origin and of vital importance in self-preservation. The rate of blinking is much higher in the herbivora than in the carnivora. The fact that the blinking rate is higher in the "hunted" animal than in the "hunting" animal suggests that its purpose is connected with the self-preservation reflex.

Blinking in the arboreal primates is much higher than that in the lower animals, presumably due to interest in their surroundings, yet the primitive blinking of the self-preservation reflex in association with the other sense organs still remains exactly as in the lower animals.

In man, the rate of blinking is similar to that in the arboreal primates. The fixation-reflex constantly changing in direction is essential, but the extramacular reflex for purposes of self-preservation is still present in its primitive form, and at any moment, when danger threatens, fixation is shut off by a blink and the eyes assume control of the body's activities in coöperation with the other sense organs.

Even in the congenitally blind in whom the act of fixation has never taken place, the eyelids blink when a threatening sound occurs. (6 figures, references.) Edna M. Reynolds.

Llanos, N. G. **Dacryocystorhinostomy.** Rev. Oto-Neuro-Oft., 1945, v. 20, June-July, pp. 69-70.

Various procedures are discussed. The author favors that of Donato Valle, which he does not describe. He dislikes the hammer and chisel method of trepanning the maxilla and ethmoid. In suturing the mucosa of the sac to that of the nose he uses 000 catgut on Dechamps needles. Edward Saskin.

Pereira, R. F., and Tolosa, E. C. **Dacryosinusitis simulating dacryocanaliculitis.** La Semana Méd., 1945, v. 52, Dec. 6, pp. 893-896.

A man aged 40 years had chronic suppuration of the conjunctival cavity of the right eye, arising from the upper lacrimal canaliculus. Catheterization of the canaliculus demonstrated, under radiographic control, the existence of a dacryoethmoidal fistula, and rhinologic examination revealed a sinusitis of the ethmoids and of the maxillary of the right side. Surgical treatment of these conditions resulted in complete disappearance of the suppuration and spontaneous closure of the fistula. (References.) W. H. Crisp.

Vaccaro, H., Cabezas, J., and Jorquera, E. **Lysozyme as a defense factor**

in ophthalmology. Arch. Chilenos de Oft., 1945, v. 1, March-April, pp. 3-24.

The authors state the results of what they call the Sarcina test (using Micrococcus lysodeikticus, supplied by the Mead Johnson laboratories). The conditions of the test are described. The normal tears provoked total lysis even in dilutions of 1 to 2,000, with 24 hours contact at 37 degrees. Greater dilutions produced partial action, there being traces of lysis even in dilutions of 1 to one million. For shorter periods of incubation, greater concentrations were required. The lysozyme content in pathologic secretions varied with the period of evolution of the disease, the proportion being increased in the earlier days of the disease for any type of ocular inflammation. The highest titer of lysozyme was experienced in those ocular affections in which bacteriologic examination was negative. (4 figures, 7 tables, 3 graphs, bibliography.) W. H. Crisp.

15

TUMORS

Love, J. G., and Benedict, W. L. **Intraorbital tumors.** Jour. Amer. Med. Assoc., 1945, v. 129, Nov. 17, p. 777.

Since the transcranial approach to tumors of the posterior orbit gives maximal exposure and direct visualization of the structures involved, and since at the same time it permits removal of an intracranial extension of the tumor, the authors feel that this is the procedure of choice. A neurosurgeon should be chosen for the surgical treatment of such retrobulbar orbital tumors. The diagnosis and treatment of posterior orbital tumors in patients aged two months to 53 years are described. Symptoms were varied, although proptosis was by far the most common. Meningioma was the most common tumor. Thirteen tumors had extended beyond the orbit. All patients recovered but one, an infant who died of hyperthermia.

Morris Kaplan.

Offret, G. **Primary epithelial tumors of the ciliary region.** Arch. d'Opht., 1945, v. 5, No. 2, p. 11.

In an extensive monograph, Offret reviews the subject of epithelial tumors of the ciliary body. He describes simple primary epithelioma as the least frequent neoplasm of the ciliary body. It develops in eyes which have suffered from traumatism or infection, particularly in elderly individuals, and is characterized by its large size, by pigmentation, degenerative changes, slow growth, association with cysts of the iris and ciliary body, and usually by the absence of metastases.

A second, more frequent primary malignant tumor, often called diktyoma and found in children from two to eight years of age, is described as "type retine." Nonpigmented, quite flat, and accompanied by increased intraocular pressure, this tumor is often mistaken for a retinoblastoma. Histologically it is made up of interlacing ribbons or membranes of one to many layers of cells, often with glandular tube formation. Rosettes are occasionally seen. There is an inconspicuous connective-tissue stroma. Hemorrhage into the tumor and areas of necrosis are frequent. Extension is limited, although perforation of the globe has occurred. The malignancy is more histologic than clinical.

The benign ciliary epithelial tumors are common; in 1932 Wolff made 58 observations. Characteristically they produce no clinical symptoms, are small in size, and demonstrable only on

microscopic examination of enucleated eyes. With few exceptions they are encountered only in individuals over 50 years of age. Histologically, these tumors are destructive because the epithelium has no connective-tissue supporting structure and no distinct vascular supply. Offret strongly opposes Fuchs's classification of these benign epithelial tumors as inflammatory and senile epithelial excrescences of the ciliary body.

Phillips Thygeson.

Paufique, L., and Chavanne, H. **Glioma of the chiasm.** Jour. d'Opht., 1944, v. 3, No. 3, p. 229.

A new case of glioma of the chiasm is reported. The patient, a man 22 years old, first developed muscular asthenia, loss of appetite, apathy, and loss of weight, in March, 1942, followed by signs of diabetes insipidus. In August, 1943, difficulty in reading developed and rapid loss of vision until there was light perception only. At this time he showed marked loss of weight, hypothermia, and loss of secondary sexual characteristics. There were no motor nor sensory neurologic findings other than the optic-nerve disturbance. X-ray studies of the skull were normal. Operation, performed in October, 1943, revealed a basal arachnoiditis. There was marked increase in the volume of the right optic nerve and chiasm. On puncture, viscous fluid was obtained from the chiasm, comparable to that found in glioma. Post-mortem examination revealed a neoplasm invading the entire region of the third ventricle. The chiasm was cystic, increased in volume. Diagnosis: glioma, histologically confirmed. A discussion of the signs and symptoms of tumors with chiasmal findings is presented.

Phillips Thygeson.

16

INJURIES

Curtis, G. H. **Contact dermatitis of eyelids caused by antioxidant in rubber fillers of eyelash curlers.** Arch. Dermat. and Syph., 1945, v. 52, Oct., p. 262.

Seven cases of contact dermatitis due to sensitivity to the rubber filler of eyelash curlers were observed. In five cases the allergen was found to be phenyl-beta-naphthylamine, an antioxidant used in the manufacture of rubber fillers. In addition to the history of contact and positive reactions to patch tests, the dermatitis may be distinguished from other common dermatoses of the eyelids as well as from eczematous contact dermatitis due to other allergens by the facts that (1) the dermatitis is subacute rather than acute and vesicular; (2) it tends to occur in linear bands; (3) if it involves the whole of the upper lid there is a narrow band of normal skin along the tarsal fold and between the dermatitis and the margin of the lid, and (4) the eyelashes show artificial curling.

Theodore M. Shapira.

Obal, A. **Comparison of the healing of perforating eye injuries before and after the introduction of milk injections (computation of the years 1907-1908 and 1937-1940).** Klin. M. f. Augenh., 142, v. 108, Sept.-Oct., p. 614.

In the years 1907 to 1909, 190 patients had been treated in the University Eye Hospital in Vienna for perforating eye injuries. One half of the eyes with lens injuries and 15.8 percent of those without lens injuries were lost. In the years 137 to 1940—that is, after the introduction of parenteral milk injection—201 patients were treated. Only 31.8 percent of the eyes

with lens injury and 9.1 percent of those without lens injury were lost. One must remember, however, that in the latter period patients with intraocular infection were given not only milk injections, but also typhoid vaccine and sulfa drugs. (References.)

F. Nelson.

Struble, G. C., and Croll, L. J. **Removal of magnetic foreign bodies.** Amer. Jour. Ophth., 1946, v. 29, Feb., pp. 151-161. (15 figures, references.)

17

SYSTEMIC DISEASES AND PARASITES

Mendonça de Barros, J. **Treatment of ocular syphilis.** Arquivos Brasileiros de Oft., 1945, v. 8, nos. 4 and 5, pp. 110-125; also Rev. Brasileira de Oft., 1945, v. 4, Dec., pp. 91-110.

This is a 16-page review of the whole subject, with emphasis upon the principle that the syphilitic patient should have thorough treatment for his general condition, and not merely for the ocular manifestations. W. H. Crisp.

Pacheco Luna, R. **Guatemalan onchocercosis.** Rev. Oto-Neuro-Oft., 1945, v. 20, Jan.-Feb., pp. 13-17.

An academic discussion of the disease is presented, including history, parasitology, and general symptoms. There are characteristic ocular symptoms which are grave, and may be followed by blindness. Photophobia, blepharospasm, and foreign-body sensation are due to a chronic keratitis, plastic uveitis, and filariae in the vitreous. The condition may terminate in phthisis bulbi and hypotension. Actual intraocular tumefaction also occurs; sometimes the tumors can be extirpated, but the disease progresses unfavorably. Treatment is unsatisfactory.

Edward Saskin.

18

HYGIENE, SOCIOLOGY, EDUCATION, AND HISTORY

Graff, Th. **War restrictions in ophthalmologic optics.** Klin. M. f. Augenh., 1942, v. 108, Nov.-Dec., p. 745.

Graff discusses the restrictions and regulations necessitated by the war. The manufacturing of biconcave and biconvex spheric and cylindric lenses as well as plano-convex, plano-concave, and periscopic lenses is forbidden. Only two types of bifocal lenses are allowed. The difference between distance and near parts must not be smaller than one diopter. When the total refractive error is greater than five diopters, lenses may be prescribed only in differences of one-half diopter; when it is greater than 10 diopters, difference must be one diopter. In cylindric lenses one-half-diopter differences are allowed. Tinted, ground lenses may be manufactured only to allow 50-percent or 75-percent absorption in the visible spectrum and total absorption of the ultraviolet rays. Clampover glasses are not permitted. Gradually ophthalmologic instruments will be strictly standardized. The author hopes that such restrictions will be perpetuated in the postwar period.

F. Nelson.

Howe, P. J., and Osterman, M. R. **Medical social service with glaucoma patients.** Sight-Saving Rev., 1945, v. 15, Summer, p. 80.

The social worker must give glaucoma patients more than financial relief. Such patients particularly need the relief from anxiety and fear which come from a free discussion with his social worker, as well as help in carrying out his part of the treatment. This

service is needed as much by private patients as by clinic patients.

R. Grunfeld.

Koch, F. L. P., and Smith, V. M. **Glaucoma clinic procedures.** Sight-Saving Rev., 1945, v. 15, Summer, p. 92.

The procedure in use at the demonstration glaucoma clinic is described in detail. R. Grunfeld.

Law, F. W. **Some public health aspects of ophthalmology.** Sight-Saving Rev., 1945, v. 15, Spring, p. 13.

In this address the author ranges over the whole field of ophthalmology. In the early history of ophthalmology in England most of the practitioners were unqualified though they achieved places of eminence in the courts. The tremendous strides made in industrial ophthalmology are discussed. Improvements in industrial and domestic lighting are described. The problem of the relation of the ophthalmologist to the optometrist and its projected solution in England are discussed. Since there are not enough ophthalmologists to accomplish all the work of refraction it is suggested that the hospitals employ properly trained, medically supervised opticians. After describing and praising orthoptic exercises the author denounces as pure charlatanism the practice of eye exercises to improve vision or to cure cataracts.

Morris Kaplan.

Minton, Joseph. **The one-eyed worker.** Brit. Jour. Ophth., 1945, v. 29, Sept., pp. 472-476.

Investigations of the employment of one-eyed workers in industry, made in 1938, are reported.

Persons who have lost an eye in childhood are in no way handicapped and have full confidence in the carrying out of their work. One finds men of this group employed in the building trades, in the engineering trades, and in the tool-making industry. They suffer few disadvantages in the labor market.

An investigation of 100 men and women who had lost an eye in adult life showed that the greatest number of injuries occurred in the mining, metal, and engineering industries, in such processes as hammering, chipping, boring, or milling.

After the excision of an eye, the patient must adjust to new visual conditions. The length of time required varies from a few weeks to several months. Women are slow to adjust, and their depth perception may long remain inaccurate. The loss of the dominant eye produces greater disability and delays adjustment to monocular vision. An instrument for determining whether the one-eyed person is left with the dominant eye is described.

The period of enforced absence from work should not exceed two or three months, but many men do not return to work for six to nine months.

Detailed accident statistics kept by safety departments indicate that there is no evidence to show that one-eyed persons are more prone to accidents than the normal-sighted.

Occupations considered suitable for one-eyed people are listed by the author. If the vision of the remaining eye is 6/6 or 6/9, the one-eyed patient can follow comfortably all occupations involving close work, except operations in the metal and engineering trades, which may cause injury to the remaining eye. If the vision is 6/12, constant close work is not recommended, but employment in the food

and distributive trades or in the building trades is advised. One-eyed drivers with 6/12 vision are considered safe. If the vision is less than 6/12, gardening, farming, and domestic service are the most suitable occupations.

The danger of injury to the remaining eye should always be considered when men wish to return to work in the engineering and metal trades. Miners should not be reëmployed in underground work. Most one-eyed men and women are fit for most jobs, but the safety of the remaining eye must be the first consideration.

Edna M. Reynolds.

Minton, Joseph. **Vision and the selection of personnel in industry.** Sight-Saving Rev., 1945, v. 15, Summer, p. 67.

All occupations may be classified in five groups on the basis of visual requirements. The occupations in group 1—the manufacture of silk yarns, silk hose, electric-light bulbs, and watches, for example—require very good eyesight (6/6 in one eye, 6/36 in the other eye). Those in group 2—all clerical work, engineering, and the driving of vehicles—need good eyesight (6/12 and 6/36). All industrial occupations except those in which depth perception is necessary form group 3. Only fair vision is needed (6/12 and 6/36 or one blind eye). Workers in group 4, those in outdoor occupations such as building trades, carpentry, dock labor, and portering may have weak eyesight (6/24 and 6/36). Group 5 contains a great number of industrial and other occupations which are suitable for the blind and the partially blind. A list of these occupations has been prepared by the National Society for the Prevention of Blindness. R. Grunfeld.

Polack, M. **Tscherning and his work.** Ann. d'Ocul., 1940, v. 177, no. 5, pp. 179-187.

Marius Hans Erik Tscherning was born in 1854, in Denmark, where he spent most of his life. His 75 contributions to ophthalmology, including his exemplary textbook on physiologic optics, are a lasting monument to a truly great man. He was admitted to the degree of Doctor of Medicine in 1887, in Paris, and remained there until 1910, when he became professor of ophthalmology in the University of Copenhagen. He retired from teaching in 1925, but continued his investigations until his death in 1939. Chas. A. Bahn.

Sorsby, Arnold. **The incidence and causes of blindness in the British Commonwealth.** Brit. Med. Jour., 1945, Oct., 27, p. 557.

The number of blind persons in the British Isles is between 90,000 and 100,000. In the Dominions, between 40,000 and 50,000 white persons and about 10 millions natives are blind. There has been a marked decline in the incidence of blindness in childhood and early youth and an increase in later life. Further decline in the incidence of blindness in youth will soon come to an end. Even now about 65 percent of blindness in youth is caused by congenital factors. Reduction in the incidence of blindness in the future can be achieved only by intensive research in the problems of congenital diseases, maternally transmitted infections, cataract, glaucoma, and the diseases of the aged. In the native population of the British possessions, the incidence of blindness could be reduced immediately and effectively by an intensified and organized effort to treat

the widely prevalent ocular infection with sulfa drugs and penicillin.

R. Grunfeld.

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ANATOMY, EMBRYOLOGY, AND COMPARATIVE OPHTHALMOLOGY

Stone, L. S. **Heteroplastic lens grafts related to factors inhibiting lens regeneration in Triturus.** Proc. Soc. Exper. Biol. and Med., 1945, v. 60, Oct., p. 10.

The presumptive lens-forming ectoderm over the optic vesicle of embryos in the early tail-bud stage was exchanged between Amblystoma punctatum and Triturus torosus. Normal lenses developed. Some of them were observed for 98 days. When the lenses of the two species were exchanged between larvae about 17 mm. in length, the exchanged lenses survived and grew well for a long time. If the heteroplastic lenses were excised 70 days after the exchange, regeneration of the lens tissue took place in the triturus eye from the dorsal rim of the iris, as it normally occurs following lensectomy. In the amblystoma eye, however, no such regeneration of the iris tissue takes place since under normal condition no regeneration of the iris tissue occurs after lensectomy.

Lenses of young adult amblystoma eyes were implanted in lensectomized eyes of adult Triturus viridescence. If the lenses survived they became endowed with the capacity to inhibit new formation of lens from the dorsal rim of the iris, but if the lens became cataractous the inhibitory effect diminished.

If lenses from the tadpole eye were implanted, or if wax spheres of the same size as normal lenses were placed in lensectomized eyes of the triturus, no inhibitory effect was exercised, and a new lens developed from the dorsal rim of the iris, proving that mechanical factors are not responsible for the inhibition.

R. Grunfeld.

PAN-AMERICAN NOTES

Edited by Dr. M. Uribe Troncoso
500 West End Avenue, New York 24

Communications should reach the editor by the twelfth of the month.

The Second Pan-American Ophthalmological Congress

This Congress was held at Montevideo, Uruguay, from November 26 to December 1, 1945. It was a decided success from the standpoint of attendance. Although the United States ophthalmologists were few in number, owing to the great difficulties in transportation, some representative members were present. Among them we must mention Captain Clifford A. Swanson, representing the Navy; Commander Walter P. Griffy, representing the Public Health Service; Dr. Ramón Castroviejo, representing the American Ophthalmological Society; Dr. Conrad Berens, representing the American College of Surgeons; Dr. Thomas D. Allen of Chicago, and Dr. Joseph I. Pascal of New York. Latin-American countries were, on the other hand, very well represented. Brazil had the largest number, with 123 members present; Chile had 16; Cuba, 19; Mexico, 3; Bolivia, 3; Ecuador, 1; Guatemala, 1; Colombia, 2; Costa Rica, 2; Paraguay, 5; Peru, 7; Dominican Republic, 1; Venezuela, 3. Uruguay, where the Congress was held, had a representation of 70 members. The Argentinian ophthalmologists did not attend the Congress officially. Even members of the Board of Directors of the Congress withdrew, because of the political conditions through which Argentina is passing. The Asociación Médica Argentina decided earlier in November, 1945, to stop all scientific activities of its members as a civil protest against the state of constitutional abnormality, which, unfortunately, has existed in that country for some time. The Argentine Ophthalmological Society, which is a part of the Medical Association, decided to find out by a plebiscite if its 80 members could attend the Congress at Montevideo as an exception to the general rule. The plebiscite had 70 members in favor of cessation of all scientific activities against 5 in opposition. The Society then addressed an official communication to the Board of Directors of the Congress, informing them of the withdrawal of Argentine members.

Dr. Vazquez Barriere, president of the Board, opened the meeting by stressing the necessity of inter-American coöperation for the advancement of ophthalmology and the prevention of blindness. Dr. Harry S. Gradle, president of the Congress, could not attend the meeting because of illness. His address was read by Professor Alvaro of Brazil, and his recommendation to form a Board of Ophthalmology for Latin-America was later acted upon and accepted.

The meetings were held according to the program previously published in this column and were quite successful and well attended, although the meeting place was a hotel somewhat distant from the city of Montevideo. The inaugural session was attended by the municipal and university authorities and members of the Diplomatic Corps. Dr. Arruga arrived from Spain after a difficult and delayed trip. His discussion of the treatment of detachment of the retina was a valuable contribution to our knowledge of the subject.

The Congress decided to change its name to "Pan-American Association of Ophthalmology." The following officers of the new association were elected at the

Montevideo meeting: president, Dr. Harry S. Gradle; honorary president, Professor Alberto Vazquez Barriere; vice-presidents: Dr. Francisco Belgeri (Argentina), Dr. Frank Brawley (U. S. A.), Dr. J. Pereira Gomes (Brazil), Dr. Frederick C. Cordes (U.S.A.), Dr. J. A. MacMillan (Canada), Dr. Alex Aguero (Costa Rica), Dr. G. Espildora Luque (Chile), Dr. R. Pacheco Luna (Guatemala), Dr. A. Torres Estrada (Mexico); executive secretaries: Professor Moacyr E. Alvaro (Brazil) and Dr. Conrad Berens (New York).

The Committee on Ophthalmological Education appointed a president, Dr. Jorge Valdeavellano (Lima, Peru), and three secretaries whose work will be divided as follows: Dr. Thomas D. Allen in charge of Canada and the United States; Dr. Miguel Branly (Cuba) in charge of Mexico, the continental countries of Central America, the islands of the Caribbean, Venezuela, and Colombia; and Dr. Paul Rodriguez Barrios (Montevideo, Uruguay) in charge of Ecuador, Peru, Bolivia, Chile, Argentina, Paraguay, Uruguay, and Brazil.

The Committee on Kellogg Fellowships appointed Dr. Harry S. Gradle, Dr. Conrad Berens, Dr. Tomas Yañes, and Prof. Moacyr E. Alvaro to represent the Association.

A committee was appointed to draw up a constitution and by-laws for the new Association. This consists of Dr. Tomas Yañes, Dr. Conrad Berens, and Professor Alberto Vazquez Barriere.

The next meeting of the Pan-American Association of Ophthalmology is planned for February, 1948, in Havana, Cuba. All ophthalmologists in the Western Hemisphere will be invited to became members of the Association. Membership entitles receiving the official publication "Ophthalmologia Ibero Americana," which has been in existence for several years and is printed in three languages: English, Spanish, and Portuguese.

Communications concerning the Association should be addressed to Prof. Moacyr E. Alvaro (1151 Rua Consolaçao, São Paulo, Brazil) if mailed south of Panama, and to Dr. Conrad Berens (301 East 14th Street, New York 3, N.Y.) if mailed north of Panama.

NEWS ITEMS

Edited by Dr. Donald J. Lyle
904 Carew Tower, Cincinnati 2

News items should reach the editor by the twelfth of the month.

Deaths

Dr. Wylie M. Ayres, Cincinnati, Ohio, died December 22, 1945, aged 71 years.

Dr. Frederick Brown, Valley City, North Dakota, died November 13, 1945, aged 65 years.

Dr. William C. Comee, Green Bay, Wisconsin, died December 8, 1945, aged 59 years.

Dr. John F. Curtin, Minneapolis, Minnesota, died December 25, 1945, aged 56 years.

Dr. Clarence P. Franklin, Philadelphia, Pennsylvania, died December 11, 1945, aged 75 years.

Dr. Lee M. Goodman, Jersey Shore, Pennsylvania, died recently, aged 64 years.

Dr. Edgar S. Harris, Independence, Missouri, died November 27, 1945, aged 68 years.

Dr. Isaiah W. Haughey, Fort Collins, Colorado, died December 5, 1945, aged 77 years.

Dr. Max L. Holland, Roanoke, Virginia, died November 9, 1945, aged 37 years.

Dr. Howard E. Jones, Circleville, Ohio, died December 12, 1945, aged 92 years.

Dr. Charles F. Jump, Helena, Montana, died October 23, 1945, aged 63 years.

Dr. William G. Kennon, Nashville, Tennessee, died January 3, 1946, aged 62 years.

Dr. John F. Klinedinst, York, Pennsylvania, died December 6, 1945, aged 78 years.

Dr. Emory L. Kniskern, Muskegon, Michigan, died January 26, 1946, aged 77 years.

Dr. Charles E. Lauder, Viroqua, Wisconsin, died December 6, 1945, aged 79 years.

Dr. David L. Martin, Boston, Massachusetts, died December 6, 1945, aged 71 years.

Dr. John H. F. O'Neil, Chicago, Illinois, died December 20, 1945, aged 61 years.

Dr. William H. Phillips, Cleveland, Ohio, died December 19, 1945, aged 74 years.

Dr. Frank D. Smith, Rochester, Minnesota, died December 8, 1945, aged 64 years.

Dr. Henry M. Smith, Brooklyn, New York, died February 23, 1946, aged 75 years.

Dr. Lee W. Smith, Butte, Montana, died November 18, 1945, aged 53 years.

Dr. Thomas M. Stewart, Cincinnati, Ohio, died December 10, 1945, aged 79 years.

Dr. William G. Stinchcomb, Bellefontaine, Ohio, died December 19, 1945.

Dr. John P. Young, Chester, South Carolina, died November 29, 1945, aged 75 years.

Miscellaneous

First Pan-American Congress of Oto-Rhino-Laryngology and Broncho-Esophagology. Immediately following and overlapping with the annual meeting of the Academy in October of this year, the First Pan-American Congress of Oto-Rhino-Laryngology and Broncho-Esophagology will take place, under the sponsorship of the Academy. This Congress will open with a banquet and evening session on Thursday night, October 17th, and will continue on the two subsequent days. The first scientific session will be a joint session with the Otolaryngology Section of the Academy, and three additional sessions will take place on Friday afternoon, Saturday morning, and Saturday afternoon. All interested members of the Academy are strongly urged to plan to remain for the Pan-American Congress, for which an excellent program is being arranged.

The registration fee will be $5.00.

Executive committee, Pan-American Congress: Gordon B. New, M.D., president; Chevalier L. Jackson, M.D., secretary; Paul H. Holinger, M.D., treasurer.

The Oregon Academy of Ophthalmology and Otolaryngology held its seventh annual Spring postgraduate convention in ophthalmology and otolaryngology from April 15th to April 20th. The guest speakers were Dr. Gabriel Tucker of the University of Pennsylvania Graduate School and Dr. Peter Kronfeld of the Illinois Eye and Ear Infirmary, University of Illinois. Dr. Kenneth C. Swan of the University of Oregon Medical School gave a course on ocular histopathology. Included in the program were lectures on endaural surgery, clinical demonstrations of problem eye cases, intranasal operations, the measurement of astigmatism, brain abscesses, Lempert operation, and cadaver demonstrations.

The International College of Surgeons, United States Chapter, will hold its eleventh annual assembly and convocation in Detroit, Monday, Tuesday, Wednesday, October 21-22-23, 1946.

Surgical clinics in Detroit hospitals will feature the first morning of the Assembly. Thereafter all the meetings, the convocation, and the exhibition will be held in the Masonic Temple, a splendid building affording every convenience.

Copy of the program and detailed information may be obtained by writing Dr. Louis J. Gariepy at 16401 Grand River Avenue, Detroit.

Societies

The fifteenth scientific meeting of the Association for Research in Ophthalmology will

be held in San Francisco, at the Hotel Mark Hopkins on Tuesday, July 2, 1946.

The fifty-second meeting of the Reading Eye, Ear, Nose and Throat Society was held on February 20, 1946, as a joint meeting with the Diplomates' Association of Berks County Physicians. The speaker of the evening was Dr. Harry Rogers, president, American College of Allergy. His talk was a review of the allergies as they apply to the specialties.

At the meeting of the Milwaukee Oto-Ophthalmic Society, held on March 26th, Dr. Samuel M. Feinberg, Northwestern University, Cook County Hospital, presented a paper on "Allergy of the eye, ear, nose, and throat: Practical evaluation and management of cases." The discussion was opened by Dr. Theodore L. Squier with Dr. F. Herbert Haessler giving the eye physician's viewpoints and Dr. Frank G. Treskow giving those of the ear, nose, and throat physician.

The Brooklyn Ophthalmological Society held its ninety-sixth regular meeting on April 18th. The scientific program consisted of the following presentations: "Ocular manifestations of skin diseases" by Dr. Nathan Sobel; and "Surgical management of squint" by Dr. Harold W. Brown.

At the annual meeting of the Pennsylvania Academy of Ophthalmology and Otolaryngology on April 24th-25th, the following program was presented: "Some interesting phases of war ophthalmology," by Dr. James N. Greear, Jr.; "Pan-American otolaryngology," by Dr. Chevalier L. Jackson; "Anesthesia in ophthalmology," by Dr. Walter S. Atkinson; "Retinal arteriolar sclerosis," by Dr. Walter I. Lillie; "Contemporary medical problems," by Dr. Robin C. Buerki; and "Symposium on the hard of hearing," by Captain Fred Harbert.

Personals

Dr. George M. Haik, New Orleans, has been appointed professor of ophthalmology at the Louisiana State University Medical School, New Orleans, succeeding the late Dr. Theodore J. Dimitry.

Major Frederic T. Becker (MC) of Memphis, spoke on "Cutaneous eruptions frequently seen in eye, ear, nose, and throat practice," at the 1946 session of the Medical Association of the State of Alabama.

Dr. Wiley R. Buffington spoke on "Detached retina" at the seventieth session of the Arkansas Medical Society, April 15th-17th.

Dr. Alan C. Woods presented a paper, entitled "Early treatment of eye injuries," before the Medical and Chirurgical Faculty of Maryland at its meeting on April 23d-24th at the Belvidere Hotel, Baltimore.

Dr. James W. White of New York was among the guest speakers at the ninth annual meeting of the New Orleans Graduate Medical Assembly.

Dr. Arthur M. Culler was among the participants in the program given by the faculty members of the Ohio State University College of Medicine on March 27th. He discussed "Progress in ophthalmologic practice and research."

Storz

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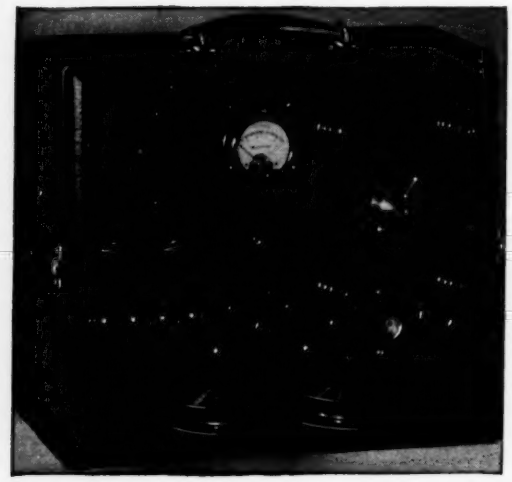

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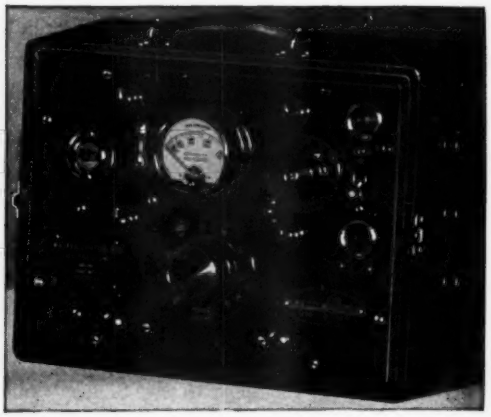

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